NOTTINGHAM UNIVERSITY BUSINESS SCHOOL

CLARIFYING VALUE IN USE AND VALUE CREATION PROCESS

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Abstract

The literature shows that value and value creation are still not fully understood phenomena. The value creation process is often described as a 'black box', illustrating how little scholars know about it (Grönroos, 2011b; Leroy et al., 2013). At the same time, value as a theoretical concept, remains challenging to define.

In addressing the literature gaps, this doctoral research employed an exploratory mixed methods approach (both qualitative and quantitative methods), to increase the integrity and applicability of the findings (Andrew and Halcomb, 2007). Using the mixed methods research tradition offers a solid platform for theory generation, theory testing and theory refinement (Creswell, 2003). Given that the customer holds a central position in creating and assessing value (Vargo and Lusch, 2008a), the research was focused on investigating value and value creation from the customer viewpoint. The research context of all the studies was the usage of digital cameras, as this offered fertile ground for value creation research. The mixed methods doctoral research, consisting of one qualitative (in the exploratory research phase) and three consecutive quantitative studies (in the confirmatory research phase), provided extensive and multi-layered findings.

The qualitative data gathered in the exploratory research phase allowed for the identification of the previously hidden structure of the value creation process. Findings from the qualitative data stage have helped to bridge the theoretical gaps in current scholarly debates and have supported the development of a stronger theoretical framework for the concepts of value and value creation. The first contribution from the qualitative data stage was the development/confirmation of a more encompassing and robust definition of value-in-use, which includes both benefits and sacrifices, and not only benefits as proposed by the current service-dominant logic and service logic literature (see Vargo and Lusch, 2008a). Second, a clear specification (or anatomy) of a value creation model was developed. Based on the qualitative findings, value creation is described as a non-linear process comprising five phases: (a) initiation phase, in which a specific goal of consumption is set; (b) resource selection phase, in which a set of resources is selected for inclusion in the consumption/usage episode; (c) resource adjustment phase, in which the selected resources

are operationally, physically, spatially and temporally prepared or adjusted ready to be integrated; (d) resource integration phase, in which the adjusted resources are applied or integrated into a service; and (e) evaluation phase, in which value-in-use is determined by the customer through an evaluation of the service output created in the resource integration phase. These findings were the basis for a model of value creation that helps to illuminate the 'black box' of value creation. Finally, the qualitative findings showed that seeing all customers exclusively as value co-creators (see FP6 in Vargo and Lusch, 2008a) is theoretically and practically problematic. Namely, it was found, and later confirmed in quantitative studies, that customers differ according to how they understand/perceive their roles in value creation. Some see themselves as the ultimate value creators, some as co-creators, and others as only the recipients of value.

The confirmatory quantitative analysis was performed using samples from the USA and the UK. Based on the qualitative model of value creation, two quantitative path models were developed and tested: a model of value co-creation and a model of customer's independent value creation. Firstly, analysis was undertaken to develop and test the new scales developed for the constructs identified in the qualitative research using both Exploratory Factor Analysis and Confirmatory Factor Analysis (using LISREL). All 15 multi-item measurement models, both reflective and formative, are confirmed to have sound psychometric features. This suggests that they could be applied as proxies to measure a range of latent phenomena important for value creation and value-in-use in other consumption contexts (with minor or no adjustments). Both models were then assessed using PLS-SEM, which offered the best tool to evaluate the complex path models that included scales, indexes and higher-order constructs. Both models explain a substantial amount of variance (app. 57%) in value-in-use as the dependent variable, thus demonstrating strong predictive ability of the proposed models. Value-in-use was confirmed to be a multidimensional phenomenon consisting of experiential, instrumental and symbolic benefits, as well as sacrifices.

This study provides ideas for practitioners about how to examine value and the value creation process in the context of the usage of their products or services. An insight into the mechanism of value creation might empower practitioners to develop more ways to help customers to create (or co-create) higher value-in-use. In general, by learning about customers' dynamics in the value creation process, suppliers may be able to establish new

interaction points, understand what resources to supply and when to suggest upgrades to customers and when to support customers in getting optimal consumption experiences from the offerings consumed or used. Furthermore, practitioners can potentially use customers' value creation awareness as a new market segmentation criterion or as a tool that will help companies determine how to market products and interact with customers who have different perceptions of their own roles in value creation.

Let there be night so that stars can shine bright

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1. Introduction

The concept of value has been of increasing interest to marketing scholars and practitioners since the emergence of marketing as an academic discipline. Value has also been studied by many other, more established disciplines, including philosophy, psychology and economics (Woodruff and Gardial, 1996). The term *value* itself has been used in different contexts (i.e. creating and delivering value, customer-perceived value, value chain, customer lifetime value, exchange context, consumption context etc.) and with various qualifiers (i.e. hedonic value, utilitarian value etc.) reflecting its complex and multifaceted nature (Babin et al., 1994; Payne and Holt, 2001). The marketing and business literature provides a range of sometimes confusing and controversial definitions of value and value creation. The differences in definitions generally stem from underlying exchange paradigms (logics), but are attributable not only to these. For example, in B2C context, value is generally defined as some form of benefits-sacrifices assessment (Walter et al., 2001; Woodruff and Gardial, 1996; Zeithaml, 1988) or hedonic appreciation of the object of consumption (Holbrook, 1994). On the other hand, in the B2B context value has been treated as the "monetary gains created mutually and reciprocally by business partners" (Grönroos, 2011b: 282). Furthermore, in the extensive marketing literature the term value sometimes implicitly refers to value-in-exchange, sometimes to value-in-use, and sometimes to both value-in-use and value-in-exchange (see Gupta and Lehman, 2005; Zeithaml, 1988) thus creating confusion about what specific aspect of value is being referred to.

The concept of value creation also appears to be problematic. Depending on the underlying exchange logic, value creation is sometimes defined as the manufacturing process whereby value is embedded in produced goods and service (basically it is equivalent to the concept to production) and sometimes as a consumption process (Vargo and Lusch, 2008a) whereby different resources are integrated by customers, sometimes with a supplier's assistance (Grönroos, 2011b). In the latter version (value creation as a consumption process), value creation was described a process through which customers/consumers become better off (Grönroos, 2008) or which leads to an increased well-being (Vargo, Maglio and Akaka, 2008).

Many authors (see Brodie et al., 2008; Grönroos, 2011b; Khalifa, 2004) have found the concept of value to be one of the most frequently used and misused concepts in the

marketing literature. In efforts by the American Marketing Association (AMA) in the USA (2004, 2007) and the Chartered Institute of Marketing in the UK (2007) to update their definition of marketing, value has been included as a focal concept (Grönroos and Ravald, 2009). Notably, the concepts of value and value creation are of central importance in the AMA's current definition of marketing, which is defined as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large" (AMA, 2007). Building on the AMA's efforts, Sheth and Uslay (2007) have argued that value creation may indeed be a more contemporary focus for marketing. On the other hand, in the domain of practice, the value concept represents the fundamental basis for all marketing activities (Holbrook, 1994) and it has been envisioned as a critical strategic weapon in attracting and retaining customers (Lee and Overby 2004; Wang et al., 2004). Hence, value and value creation appear to be equally significant for both marketing scholars and marketing practitioners. However, questions such as: what is value; how is it created, and by whom, still lack sound explanation and academic consensus.

Adding to the scholarly complexity of the topic is the fact that an alternative exchange logic, known as 'service-dominant logic' (SDL), emerged in the previous decade. The advocates of this new logic named the previously existing logic 'goods-dominant logic' (GDL). With the emergence of the new logic, contemporary marketing thought started operating on these two exchange logics: goods-dominant and service-dominant logic (as labelled by Vargo and Lusch, 2004a). These two coexisting logics conceive key common denominators of exchange, value, value creation, sources of differential advantage, and the roles of customers and suppliers in value creation, etc., differently. Shortly after the emergence of SDL, an additional service based logic called 'service logic' (SL) has emerged established by Grönroos (2006) following his critical appraisal of SDL. SDL and SL are closely related, service based logics[1], with few points of divergences and open issues.

The first and crucial distinction between GDL and service based logics of marketing can be found in what each regards as the dominant form of exchange. In GDL, goods are the dominant form of exchange, while services are the 'inferior' or subordinated form. In GDL, services are defined residually as being imperfect goods, with features of inseparability, perishability, intangibility and heterogeneity (Zeithaml et al., 1985). On the other hand,

[1] In this work SDL and SL will be jointly referred to as service based logics

service based logics overcome this bifurcation and state that service is a common denominator of exchange. 'Service' is here not a concept equivalent to services as a form of company's output (Vargo and Lusch, 2004a), but is defined as the application of operant resources (knowledge and skills) for the benefit of another party or the entity itself (Lusch and Vargo, 2006a; Vargo and Lusch, 2008a).

The concept of value creation provides a good illustration of the key differences between GDL, SDL and SL. In traditional marketing thought, based on GDL, it is explicit that value is produced and delivered unilaterally by the manufacturer/supplier (see Naumann, 1995; Porter, 1985; Slywotzky, 1996). This goes hand in hand with the implicit premise of GDL that value is embodied in the outputs of production. Furthermore, customers are considered to be passive recipients of value, which they acquire only through the process of exchange, and consumption is considered to be value destruction (Vargo and Lusch, 2008c).

In contrast to GDL, in SDL value is generally conceptualised as co-created and determined in use by the customer (Vargo and Lusch, 2004a, 2008a). According to Lusch, Vargo and Wessels (2008) and Vargo and Lusch (2006), inputs from customers, suppliers and other parties are required for value to be created (which they term 'value co-creation'). Usage/consumption is considered to be the 'meeting' point of suppliers' and customers' resources, where customers, through resource integration, co-create value. Some authors (see Cova et al., 2011; Grönroos, 2011a, 2011b) insist on the concept of customer-supplier direct interaction for the process to be described as *value co-creation*. They argue that only where customers and suppliers share the process of resource integration and where two parties can influence each other directly can value be co-created. However, SL maintains that if the process of consumption is not assisted directly by a supplier, authors consider it to be the *customer's independent value creation* (Grönroos, 2011b). Both value co-creation and customer's independent value creation are variants of value creation. Given its precision, the labelling of value creation variants proposed by Grönroos (2011b) is used in this thesis. This way the customer/consumer has the active role in the process of value creation. More precisely, SL shifts value and value creation from the exclusive domain of manufacturers/suppliers either to the joint domain of suppliers and customers or to the domain of customers only. However, despite this attention from scholars and the rich literature on value in both traditional and contemporary marketing theory, a clear and

unambiguous understanding of what value is, how value is created and by whom, has still to be achieved.

The importance of value creation and value in GDL is reflected in numerous literature streams that closely study value from different aspects (i.e. *creating and delivering superior customer value*, *value chain*, *augmented product concept*, *customer value*, *customer satisfaction*, *service quality* etc.). On the other hand, the importance of value and value creation in the SDL and SL is clear, since these two concepts are explicitly built into the foundational premises of the service based logics themselves. Even though theoretically ground-breaking, the core ideas of SDL/SL need additional empirical exploration and further refinement, as suggested by Winklhofer et al. (2007). The main reasons for empirically testing and examining ideas of SDL/SL can be found in Hunt's (1992) description of marketing as an applied discipline and Lewin's maxim (1951: 169) that "nothing is as practical as a good theory". Therefore, in an applied discipline such as marketing, a good theory should also be able to assist practice and help practitioners achieve either better results or a better understanding of the focal phenomena. Furthermore, good theories should have a pedagogical value and an explanatory power that exceed those of alternative or preceding theories.

Ideas of SDL/SL have engaged a large community of scholars in a constructive dialogue. SDL has managed to integrate into a single theoretical framework many ideas that emerged previously in different schools of marketing and economics (e.g. Bastiat's idea of service as a common denominator of exchange; Prahalad's conceptualisation of the customer as co-creator of value and value as a collaborative process etc.). These novel ideas have the potential to significantly improve both marketing practice and our understanding of marketing concepts, and thereby ultimately alter for the better the way marketing practice and marketing science are approached. It is therefore worth exploring whether SDL/SL actually bring theoretical progress to marketing thought, and whether we need 'alternative' logics at all. In this light, Laudan (2002) suggests that any new logic or theory demands testing. Hunt (2011) argues that testing and theory evaluation themselves *per se* inherently contribute to the theory. Laudan (1991: 563) considers that "progress and [theory] testing are intimately intertwined; progress occurs when we are able to replace a less well-tested theory by a better-tested or better-confirmed rival. And we are justified in calling this 'progress' because what the tests indicate is that one theory is more apt to further our goal

of achieving dependable theories than its rival." Therefore, a new theory/logic requires testing and empirical confirmation.

This thesis presents a research project that was from the outset open to every possible outcome, whether confirmation or alteration of existing knowledge, new findings or potential rejection of parts of SDL/SL theory. Even though this is a high aim, the fact is that SDL/SL still lack empirical confirmation, even of their foundations. This is why it well suited as the basis for a re-examination of the topics of value and value creation. The following section will outline the research objectives.

1.1. Research objectives

Despite the increasing attention, numerous definitions of value and identified features are highlighted and there is remarkably little in the way of consensus in the literature on what constitutes value, how value is created, or who creates it (Baron and Warnaby, 2011a, 2011b; Baron and Harris, 2008; Payne and Holt, 2001; Vargo and Lusch, 2006; Woodruff and Flint, 2006). A number of theoretical issues surrounding value and value creation remain unresolved and offer opportunities for further study. Some of these issues are the focus of this work, specifically:

- What exactly is value?
- How and by whom is value created?
- Is there a structure to the value creation process?

Answers to these broad questions will have important implications for marketing theory and practice. First, theory lacks an unambiguous definition of value. Finding one or establishing that value cannot be clearly defined will be an important contribution. Second, establishing which party/parties are involved in value creation process will help researchers and practitioners to narrow their focus on actor(s) that are truly significant for this process, and reveal whether customers create value and, if so, whether they are aware of their value creation roles. Customers' value creation awareness could have serious implications for the

way companies approach, engage and communicate with customers. Adding to this, value creation awareness might be a new criterion for market segmentation. By determining how value is created and by whom, companies can learn how and whom to assist in value creation so that competitive advantage can be achieved. Third, once we understand what the elements of value are, we will have a solid base for undertaking value research that will help companies to investigate what value is in a particular context, industry, product or service.

Through the three research themes explained above, this work will more closely examine the weaknesses and strengths of SDL/SL. One of the tasks here is to examine whether marketing can have contemporary definitions of certain key concepts such as value that can remain aparadigmatic (valid within all coexisting logics). Since we have multiple logics now with their own lexicons, marketing scholars and practitioners need to clearly outline which 'logic language' they speak, or, indeed, whether a single common language can be identified that will allow greater understanding across both logics. Aparadigmatic definitions of value and value creation (if possible) may help bridge theoretical gaps. Ultimately, for practice, a more detailed understanding of value and value creation can help practitioners to better design their marketing approaches and have new views on consumption and exchange phenomena.

1.2. Outline

Chapter 2 presents a review of the literature using a historical approach. It explains phases in the historical development of the theoretical conceptualisations of value and value creation and how views on these two concepts have evolved over time. Furthermore, the chapter identifies the theory gaps and problems with the current SDL/SL, proposes research questions based on the identified gaps and explains the theoretical contribution. Chapter 3 presents a discussion of the dominant methodologies in social sciences, discusses and justifies the selection of mixed methods as a research approach and outlines the sequence of empirical studies that are performed in exploratory (qualitative) research phase and confirmatory (quantitative) research phase of the research presented here. Chapter 4 presents the exploratory research phase, which comprised one empirical qualitative study. The chapter starts with a hypothetical model of value creation, explains and justifies the use

of a semi-structured interview as a qualitative research method. It goes on to explain purposive sampling and thematic content data analysis. Finally it presents the qualitative findings from 29 interviews with camera users and proposes an empirically based model of value creation. Chapters 5 and 6 present confirmatory research phase comprising 2 quantitative studies based on structural equation modelling that have the aim to test and confirm/reject findings from the exploratory research phase. Chapter 7 provides discussion of the findings in the light of what is currently known in the SDL/SL literature, limitations, recommendation for future research and managerial implications of the new knowledge generated in this doctoral research.

2. Literature review

The key objective of this PhD study was to advance and contribute to marketing theory through theoretical and empirical research. This was a challenging task, and the initial step was to provide insight into how the theoretical concepts of interest have evolved through the history of marketing thought. This chapter introduces readers to the historical development of the concepts of value and value creation, as this is of fundamental importance for understanding the topic of the research and further theory development. The chapter starts with the rationale for the historical approach to this literature review and continues with an exploration of the concepts of value and value creation within each of the identified historical phases. Finally, the chapter ends with a theory gaps outline.

2.1. Importance of the historical approach to literature review

Historical research entails the systematic collection and analysis of data with the aim of understanding some entity or entities through time. Jones (2010) argues that historical research in marketing offers opportunities for charting our past and better understanding our present. That is, in order to gain a full understanding of concepts and theories, it is necessary to know who developed them, when they were developed, the wider contexts in which they were developed, the purposes for which they were developed, the industries that used them and often created them, and the constraints under which they were developed (Hunt, 2011). Hunt (2010a) calls on marketing researchers to be historically informed with regard to historical research methods, the history of marketing practice, and the history of marketing thought, as these advance the understanding and development of marketing theory. Hunt (2011) criticised marketing for its lack of attention to historical research, and pointed out that this was harmful for its development as a discipline. Tamilia (2011) is aligned with this contention and argues that the bad practice of certain scholars in ignoring accumulated knowledge from the past is causing theoretical losses, with dire consequences for the nature and scope of marketing as an academic discipline.

Savitt (1980) maintains that historical study makes a discipline more robust. Hunt (2010b) holds that the inclusion of historical reviews as part of thorough scholarly research helps to build strong theories. Historical reviews bring meaning to and understanding of extant theories, and are a prerequisite for the development of new theories (Hunt, 2010b). Adding to this, historical research can prevent theoretical loss, as it allows the researcher to gather knowledge on particular issues from different schools of thought and different paradigms and logics (Shaw and Jones, 2005). Historical reviews also help resolve certain theoretical controversies and debates. Hunt (2011) clearly demonstrated this using two examples: how a historical approach to studying phenomena of marketing interest contributed to a solution to the product differentiation and market segmentation controversy; and a rejection of the interpretivists' argument that positivism and quantitative research, as social research approaches, are dead.

Compounding the problem of lack of interest in historical reviews is scholar isolation or the tendency of scholars to remain intellectually isolated in their narrow field or school of thought. In their seminal article, Shaw and Jones (2005) clearly demonstrated that researchers within a particular school[2] of marketing seldom recognise the existence of other marketing schools or the relationship of one to another. According to Hollander (1980), no single school of thought by itself provides a satisfactory analysis of the whole of marketing thought. As each of the marketing schools explains a substantial body of knowledge and as marketing scholars tend to remain within the borders of their school, marketing knowledge is becoming increasingly fragmented (Shaw and Jones, 2005). Tamilia (2011) argues that if the discipline fragments such that each school of thought is like an academic silo, scholars no longer feel they need to know much about marketing thought, marketing history, or marketing theory in general. Remaining in one silo leads to a narrow, mono-dimensional and therefore fallible understanding of issues explored by marketing, implying that scholars within particular schools are generally limited in recognising other aspects or levels of the problem they study.

The historical literature review: (1) enables a holistic understanding of the phenomena of interest, as it prevents a researcher focusing on the developments of only one school of

[2] Shaw and Jones (2005) define a marketing school as a substantial body of knowledge, developed by a number of scholars, describing at least one aspect of the what, how, who, why, when and where of performing marketing activities

thought and only one era (Shaw and Jones, 2005); (2) contributes to the clarification of and better understanding of extant theory (Jones, 2010; Savitt, 1980); (3) helps resolve theoretical controversies (Hunt, 2011); (4) helps to delineate the academic boundaries of the field (Tamilia, 2011); and (5) contributes to the development of new theory (Hunt, 2010a, 2010b). These are the main arguments for following this literature review approach. Given the topic and the diversity of research conducted within a number of different schools (paradigms), a historical review appears to be the natural start to this study.

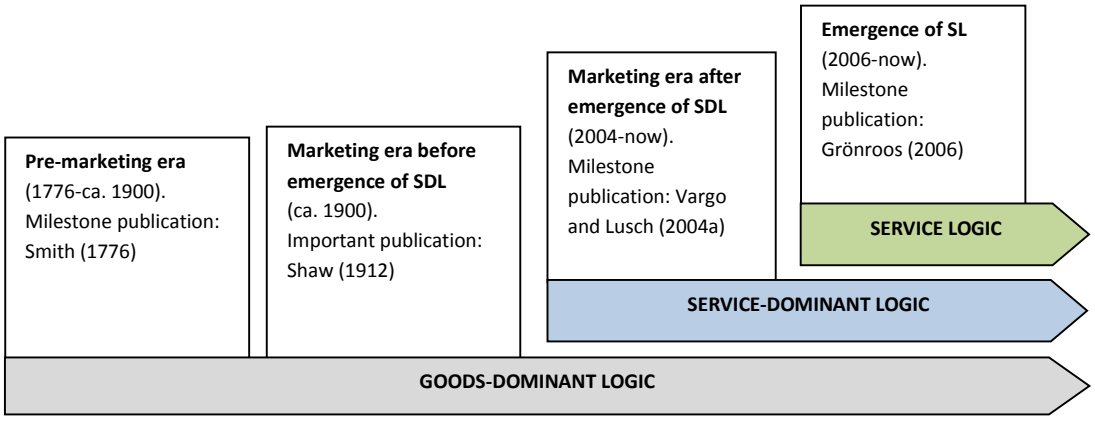
2.2. Timeline of the scholarly study of value

The history of the theoretical concept of value is divided according to two criteria: discipline and underlying exchange logic. The reasons are as follows:

1. The discipline of this study is marketing, which only recently emerged as a discipline (notwithstanding the fact that a number of focal marketing topics were explored before by other disciplines).
2. Marketing inherited foundations from its mother science, economics, one of the most important of which is the GDL, established by Adam Smith in 1776 (Lusch and Vargo, 2006a).
3. The underlying GDL was not formally or systematically challenged until the seminal paper by Vargo and Lusch (2004a) “Evolving to a New Dominant Logic for Marketing”, which is considered to be the moment from which marketing theory started operating on two coexisting exchange logics.

Having clarified the principles for establishing distinct theoretical periods (henceforth termed eras) the next step was to determine each era's beginning. The beginnings (start points) are set according to the important developments (scholarly publications) that mark a significant difference or impact or contribution to the theory. The identified eras are: the pre-marketing era dominated by traditional economics; marketing before the emergence of SDL; and marketing after emergence of SDL (see Figure 1). It is important to mention that the emergence of each era was gradual. For example, the emergence of SDL in 2004 was preceded by three decades of scholarly work challenging the foundations of traditional marketing and trying to set marketing free from “goods marketing” (Vargo and Lusch, 2004b).

Figure 1: Timeline of the scholarly study of value



2.3. Value in the pre-marketing era

An important milestone in the understanding of value and exchange was set by Adam Smith (1776/1904) in his work *The Wealth of Nations* (Vargo et al., 2006). His views on value, value creation and goods as the primary means of exchange were subsequently embraced by many scholars and established the foundations of economic thought. Smith is considered the 'father of economics' and to be the first economist in the true meaning of the word. Smith (1776/1904: 30–31) defined 'real value' as "the labour required to afford the necessities, conveniences and amusements of human life through the labour of others" (Vargo and Morgan, 2005). However, having established that labour was the fundamental source of value, he moved his attention to 'nominal value' – the price paid in the marketplace. Smith believed that people could more easily think about quantities of things rather than quantities of labour (Vargo et al., 2006). From Smith's perspective, value was inevitably connected with production, and thus was an inbuilt feature of all products (mainly because goods can be easily converted into money). Value was *de facto* an output of production and existed *per se* as captured in goods. Smith believed that a nation could get richer only through production for export, as this increased the amount of gold in the country. Production was considered, thus, the basis of value creation.

Smith had ideological opposition in Say (1821), Mill (1848) and Bastiat (1860), who believed that value was not in the objects themselves but in their usefulness. These authors criticised

Smith for trying to tie value to tangible objects. According to them, value was seen as "the comparative appreciation of reciprocal services" exchanged to obtain utility (Vargo and Morgan, 2005). Bastiat (1860) and Mill (1848) recognised that humans, rather than creating matter, transformed matter through service into a state that could provide satisfaction (Vargo and Morgan, 2005). Because the value of matter resided in the service rendered upon labour, and since material things require effort to provide utility, these objects could not possess value *per se* (Vargo et al., 2006; Vargo and Morgan, 2005). Despite these voices of opposition, the ideas introduced by Smith became the dominant and widely embraced view and have stood as the foundation of economics and marketing. This worldview, with particular reflection on the creation and nature of value and exchange, has been termed the GDL or goods-dominant paradigm (Lusch and Vargo, 2006a). Despite the fact that GDL had opposition from the beginning, a clearly articulated alternative logic only emerged 150 years later, in the work of Vargo and Lusch (2004a). The next section will analyse the literature on value in the marketing era prior to the emergence of SDL.

2.4. Value in the marketing era before the emergence of SDL

According to Doyle (2011), the exact date when marketing emerged as a discipline is not clear. However, the early years of the 20th century were when marketing developed its first scholarly publications. Shaw (1912) was one of the first academics to address a number of marketing problems (predominantly problems of distribution) from the viewpoint of an individual company (Shaw and Jones, 2005). His pioneering paper defined the role of the businessman (marketer) as "searching out human wants and providing the means of gratification" (Shaw, 1912: 706). Shaw (1912: 709) indirectly defined the concept of value by defining the concept of consumer surplus, which represents "the difference between the market value for a commodity and the subjective value of the commodity to the individual consumer. Each individual sets up for themselves a ratio of exchange between commodities which finds expression in the price they would be willing to pay for a given commodity rather than go without it". Shaw's work is interesting as it also addresses the issue of value, as dependent on subjective value (or benefits customers enjoy) and the market price a customer needs to pay for a commodity (the sacrifice a customer makes).

Later in the marketing era, a plethora of definitions of and perspectives on value emerged. An extensive literature review is given in Table 1, which is an update of the Payne and Holt (2001) review. This is followed on the two broad 'value' literature streams within marketing before the emergence of SDL. In Table 1, articles are firstly grouped according to the customer/company perspective and then within each of these broad fields a number of important subgroups (literature streams) related to value are defined, based on distinct topics. A brief summary of each of the identified literature streams is also given in Table 1.

Table 1: Literature streams in research on value within marketing before the emergence of SDL

PERSPECTIVE	LITERATURE STREAM	IMPORTANT PUBLICATIONS	LITERATURE FOCUS
VALUE FROM THE PERSPECTIVE OF COMPANY	CREATING AND DELIVERING SUPERIOR CUSTOMER VALUE	Grönroos (1990); Band (1991); Vandermerwe (1993); Slater and Narver (1995); Brown (1995); Christopher (1997); Scott (1998); Bowman and Ambrosini (1998)	This literature investigates how companies can become more market and customer focused through creating and delivering superior value. The emphasis is on the linkages between customer value, organisational profitability, performance and competitive advantage. Authors argue that company success depends on the extent to which companies can implement marketing orientation and deliver value to customers. The discourse of delivering value implies that value creation is in the charge of companies/suppliers.
	VALUE CHAIN	Porter (1985); Bower and Garda (1985); Norman and Ramirez (1993); Juttner and Wehrli (1994); Piercy (1998)	This literature describes the whole company through the processes that create/add value or support value creation. The output of the business process is value embodied in the market offerings.
	AUGMENTED PRODUCT CONCEPT	Levitt (1969, 1980); Collins (1989); Lovelock (1995); Christopher (1997)	This literature postulates that companies do not compete with their products only but also with what is added to the products (advertising, services, packaging, delivery etc.). Here, value is 'something' that can be added to the core product.
VALUE FROM THE PERSPECTIVE OF CUSTOMER	CUSTOMER VALUE AND CUSTOMER PERCEIVED VALUE	Zeithaml (1988); Holbrook (1994) Gordon , Kaminski, Calantone et al. (1993); Fredericks and Salter (1995); Butz and Goodstein (1996); Ravald and Grönroos (1996); Woodruff and Gardial (1996); Woodruff (1997); Lapierre (2000);	In this literature there are two competing views on what customer value is. Authors focused on either value-in-exchange or value-in-use (the value customers obtain from the consumption event). Some of the authors, like Woodruff (1997), tried to provide a holistic value model encompassing value-in-exchange and value-in-use through the value hierarchy model by explaining how customers assess value in different phases of exchange and consumption.
	CUSTOMER SATISFACTION AND SERVICE QUALITY	Churchill and Surprenant (1982); Parasuraman, Zeithaml and Berry (1985); Parasuraman, Berry and Zeithaml (1991); Anderson, Fornel and Lehmann (1994); Fornel, Johnson, Anderson et al. (1996);	This literature explores concepts of satisfaction and service quality as they influence value perception. The focus is on the approaches used to measure customer satisfaction and perceived service quality.

A number of literature streams – *Creating and delivering superior customer value*; *Value chain*; and the *Augmented product concept* – clearly demonstrate strong commitment to the paradigmatic premise that value is created solely by companies, manufacturers or suppliers (Ponsonby and Boyle, 2004). Literature streams such as *Customer value and customer perceived value* and *Customer satisfaction and service quality* explore value from the customer viewpoint. Even though each of the identified literature streams is important for marketing knowledge, it is beyond scope of this study to go into them all in more detail. As already mentioned, the two focal concepts of research interest in this doctoral work are value and value creation. Therefore, further analysis will offer a more in-depth exploration of the literature on *Customer value and customer perceived value*. The following section will be of particular importance, as the literature stream *Customer value and customer perceived value* is rich and heterogeneous, offering different views on what value is and how value can be defined from the perspective of the customer. Another benefit of thoroughly analysing this body of knowledge is it provides reference points for the comparison of definitions and conceptualisations of value given in the service based logic literatures discussed in Section 2.6. Therefore, it would be useful to compare and contrast conceptualisations of value and value creation according to the GDL, SDL and SL authors, as there might be (despite serious differences) a basis of knowledge synergies and further expansion (i.e. some elements of the value given by GDL might be also valid in the context of SDL/SL).

2.4.1. Customer value

The construct of costumer value emerged in the early 1980s. Value has been recognised as the fundamental basis of every marketing activity (Holbrook, 1994, 1999) and has been envisioned as a critical strategic weapon in attracting and retaining customers (Lee and Overby, 2004; Wang et al., 2004). Customer value is outlined as an important source of knowledge to support the establishment and maintenance of competitive advantage for the firm (Mizik and Jacobson, 2003; Spiteri and Dion, 2004; Woodruff, 1997; Gordon et al., 1993). However, the extent and heterogeneity of the various studies have created a rich and sometimes confusing base of knowledge about customer value (Sánchez-Fernández and Iniesta-Bonillo, 2006). Interestingly, when talking about customer value, most scholars studied either value as obtained in exchange (value-in-exchange) or value obtained from the consumption event (value-in-use), while articles studying both aspects of value are in the minority (see for example Zeithaml, 1988).

For the purpose of further analysis, definitions of value from both streams are given in Table 2 and Table 3. Thematic analysis has been conducted in order to determine the key features and explanations of value around which scholars agree or disagree. The classifications given in Table 2 and Table 3 were based on an evaluation of the implicit and explicit references of authors in relation to the exchange or consumption settings when they discuss or define value. Articles were thoroughly reviewed to determine whether an author maintains that value is defined as a phenomenon that emerges in the exchange setting or in the consumption/usage setting. This is done because in some cases the definition itself does not imply to which context it refers (see Zeithaml, 1988; Oliver, 1999). In most of the cases of unclear or confusing definitions, the clarification of ideas could be found further in articles. Having classified the definitions, these were then thematically analysed to determine the key features of value-in-exchange and value-in-use and to highlight areas of agreement or disagreement on these features.

Table 2 and Table 3 present the definitions of customer value with regard to the value-in-exchange and value-in-use perspectives respectively.

Table 2: Pre-SDL definitions of customer value: value-in-exchange perspective

SOURCE	DEFINITION	KEY FEATURES OF VALUE
Porter (1985: 131)	*"Buyer value is buyer-perceived performance and buyer cost."*	performance/costs trade off, perceptual
Zeithaml (1988: 14)	*"Perceived value is the consumers overall assessment of the utility of a product based on perceptions of what is received and what is given."*	what is received/what is given trade off, perceptual, staged, arbitrary
Lichtenstein, Netemeyer and Burton (1990: 54)	*"Value is ratio of quality and price."*	quality/price trade off
Dodds, Monroe and Grevval (1991: 308)	*"The cognitive trade-off perception between perceptions of quality and sacrifice results in perceptions of value."*	quality/price trade off, perceptual
Monroe (1991: 46-47)	*"Perceived value represents a trade-off between buyers' perceptions of quality and sacrifice and is positive when perceptions of quality are greater than perceptions of sacrifice."*	quality/sacrifice trade off, perceptual
Anderson, Jain and Chintagunta (1993)	*Value is perceived worth in monetary units of the set of economic, technical, service and social benefits received by customer in exchange for the price paid for a product offering, taking into consideration the available alternative suppliers' offerings and prices.*	benefits/price trade off
Liljander and Strandvik (1993: 14)	*"Perceived value equals perceived benefits/perceived price."*	benefits/price trade off, perceptual
Peter and Olson (1993)	*The value is the utility consumer receives when purchasing a product.*	utility/costs
Chang and Wildt (1994)	*Perceived value is positively related to quality, but negatively to the price.*	quality/price trade off, perceptual
Gale (1994: XIV)	*"Customer value is market-perceived quality adjusted for the relative price of the product."*	quality/price trade off, comparative, perceptual
Rust and Oliver (1994: 7)	*"Value is some combination of what is received and what is sacrificed."*	get/sacrifice combination
Treacy and Wiersema (1994)	*Customer value is sum of the benefits minus the costs incurred in acquiring the product or service.*	benefits/costs difference
Fornell et al. (1996)	*Perceived value is the perceived level of product quality relative to the price paid.*	quality/price trade off, perceptual
Sinha and DeSarbo (1998: 236)	*"Value is quality that the consumers can afford."*	quality/costs trade off

Table 2 (continued): Pre-SDL definitions of customer value: value-in-exchange perspective

SOURCE	DEFINITION	KEY FEATURES OF VALUE
Hunt and Morgan (1995)	*Value refers to the sum of total of all benefits that consumers perceive they will receive if they accept the marketing offering.*	sum of benefits, perceptual
Anderson and Narus (1998)	*Value in business markets is the worth in monetary terms of the technical, economic, service, and social benefits a customer company receives in exchange for the price it pays for a market offering.*	benefits/price trade off
Sirohi, McLaughlin and Wittink (1998: 228)	*"We define value as what you get for what you pay."*	pay/get combination
Oliver (1999: 45)	*"Value is a positive function of what is received and a negative function of what is sacrificed."*	benefits/sacrifices function
Hunt (2000: 138)	*"Value refers to the sum total of all benefits that consumers perceive they will receive if they accept a particular firm's market offering."*	sum of perceived benefits
Kothandaraman and Wilson (2001: 380)	*"Value is the relationship of a firm's market offering and price weighed by the consumer against its competitor's market offering and price."*	market offering/price trade off, comparative
Lapierre (2000: 123)	*"Customer-perceived value can be defined as the difference between the benefits and the sacrifices (e.g. the total costs, both monetary and non-monetary) perceived by customers, in terms of their expectations, i.e. needs and wants."*	benefits/sacrifices difference, perceptual, comparative
McDougall and Levesque (2000: 394)	*"Broadly defined, perceived value is the result or benefits customers receive in relation to total costs (which include the price plus other costs associated with the purchase). In simple terms, value is difference between perceived benefits and costs."*	benefits/costs relation/difference, perceptual
Oliva (2000: 56)	*"Customer value is the hypothetical price for a supplier's offering at which a particular customer would be at overall economic break-even, relative to the best alternative available to the customer for performing the same set of functions."*	price/set of functions equilibrium, comparative
Slater and Narver (2000: 120)	*"Customer value is created when the benefits to the customer associated with a product or a service exceed the offering's life-cycle costs to the customer."*	benefits/costs trade off
Van der Haar, Kemp and Omta (2001: 628)	*"The customer value concept assesses the value a product offers to a customer, taking all its tangible and intangible features into account."*	tangible and intangible features, perceptual, arbitrary
Chen and Dubinsky (2003: 326)	*"Perceived customer value is a customer's perception of the net benefits gained in exchange for the costs incurred in obtaining the desired benefits."*	net benefits/costs trade off, perceptual

Table 3: Pre-SDL definitions of customer value: value-in-use perspective

SOURCE	DEFINITION	KEY FEATURES OF VALUE
Holbrook and Corfman (1985: 40)	"Value is an interactive relativistic preference experience characterising a subject's experience of interacting with some object. The object may be anything or event."	perceptual, preferential, experiential
Reuter (1986)	Value is the performance of the product in a given customer application.	performance, context dependent
Zeithaml (1988: 14)	*"Perceived value is the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given."*	arbitrary, benefits/sacrifices trade off, perceptual, staged
Mattsson (1991: 42)	*"Value experiences are the ultimate effects of consumption. Product value patterns are the effects of an ongoing evaluative act by a consumer on being exposed to a product."*	experiential, arbitrary, subjective
Holbrook (1994: 27)	*"Customer value is an interactive relativistic, preference experience. Value results from consumers' interaction with the object (product/service/event)."*	preferential, experiential , comparative, subjective
Woodruff and Gardial, (1996: 54)	*"The value that is relevant for a customer is the customers' perception of what they want to have happen … in a specific use situation, with the help of a product or service offering, in order to accomplish a desired purpose or goal."*	perceptual, comparative, context specific, comparative, goal driven
Butz and Goodstein (1996: 63)	*Customer value is "the emotional bond established between a customer and a producer after the customer has used a salient product or service produced by that supplier and found the product to provide an added value."*	experiential, subjective
Vandermerwe (1996: 772)	*"Value is not what goes into products or services; it's what customer gets out of them. Customer gets value over period of time, rather than a point of time. Value happens in customer's space."*	subjective, context dependent, dynamic, cumulative
Woodruff (1997: 142)	*"Customer value is a customer's perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from the use that facilitate (or block) achieving the customers goals and purposes in use situations."*	multi-staged, perceptual, comparative, product attributes goal and context dependent, arbitrary
Walter et al. (2001: 366)	*"We understand value as the perceived trade-off between multiple benefits and sacrifices gained through a customer relationship by key decision makers in the supplier's organisation."*	benefits/sacrifices trade off, relationship
Eggert and Ulaga (2002)	*Customer-perceived value is trade-off between the multiple benefits and sacrifices of a suppliers offering, as perceived by the customer, and taking into consideration the available alternative suppliers' offering in a specific use situation.*	benefits/sacrifices trade off, comparative, perceptual, arbitrary

Based on the literature review, 37 definitions of customer value were identified. Studying value-in-exchange or value-in-use has had significant implications for the way scholars define value. The opposite can also be true – the way scholars defined value determined their empirical interests and approaches related to value and value creation. More than two-thirds of these articles on customer value studied value-in-exchange, probably because of the strength of the GDL and its underlying presumption that value is unilaterally delivered to the customers by suppliers/manufacturers (Lusch and Vargo, 2006b). This presumption suggests that customers are considered to have no influence on value creation and are arbiters and passive recipients of value provided by suppliers (Ponsonby and Boyle, 2004). Furthermore, what happens in the realm of the customer as regards value-in-use appears to be less important. This is because scholars within the traditional GDL maintained that the supplier's (manufacturer's) settings and processes are the only possible platform for value creation. Conceptualising the customer as not having a role in, or not having an influence on, value creation resulted in the understanding of the usage context as the context of value destruction (Schmenner et al., 2009).

2.4.1.1. Customer value as value-in-exchange

There is a strong consensus as to how GDL authors define customer value-in-exchange. Customer value as value-in-exchange is generally defined as the **sum of perceived benefits** (Hunt, 2000), as a **benefits/costs trade-off** or **ratio**. The concept of a trade-off is derived from the economic theory of 'utility' (Grönroos, 1997). Utility theory states that customers spend to maximise the satisfaction they get from products and services (Bowman and Ambrosini, 1998). Benefits, when explicitly stated, are usually referred to as *performance* (Porter, 1985), *quality* (Monroe, 1991; Lichtenstein et al., 1990; Dodds et al., 1991; Gale, 1994; Chang and Wildt, 1994; Fornell et al., 1996; Sinha and DeSarbo, 1998), *utility* (Peter and Olson, 1993), *tangible and intangible features* (Van der Haar et al., 2001) and *worth* (Anderson et al., 1993; Anderson and Narus, 1998). Perceived sacrifice involves recognition of all the monetary and non-monetary costs (time, energy, effort) buyers incur when they make a purchase (Zeithaml, 1988; Lapierre, 2000; McDougall and Levesque, 2000).

Value-in-exchange is therefore generally considered as **arbitrary** (Zeithaml, 1988; Van der Haar et al., 2001) and a **perceptual phenomenon** – a phenomenon that is dependent on the

particular customer's perception (Gale, 1994; Hunt and Morgan, 1995; Fornell et al., 1996; Lapierre, 2000; McDougall and Levesque, 2000). Value-in-exchange is also described as being determined through **comparison** of an offering against alternative suppliers' offerings (Anderson et al., 1993) and other offerings available on the market (Gale, 1994; Konthandaraman and Wilson, 2001). For example, Butz and Goodstein (1996) even use the term 'added value' to describe superior value or positive value advantage over the products or services of competitors. Assuming that customers need to compare, it is implicit that customers have knowledge about an offering or actively seek information on what is available in the market prior to purchase in order to establish a personally acceptable price–benefits relationship.

Value-in-exchange is largely defined as the ratio between benefit (quality) and sacrifice (cost). Using this definition, without further critical evaluation, value as a concept was 'technically' straightforward to study and operationalise in both scholarly and managerial settings. For practitioners, it was generally sufficient to determine (for example, using conjoint analysis) how customers weight the different attributes of a product or service, and how an optimised set of attributes was related to the price and other sacrifice elements of an offering (Band, 1991; Gale, 1994). Therefore, a supplier could 'easily' determine what customers, in an exchange context, considered to possess or add value, and, thus, optimise the offering to outperform or appear more desirable than what was currently provided in the market. Therefore, the research on customer value was generally limited to the exchange setting (or supplier-controlled setting) and did not explore what happens post-exchange (in the customer-controlled setting). Defining value as the ratio between benefit and sacrifice goes hand-in-hand with the traditional economic ideas of customers as utility seekers and utility maximisers.

2.4.1.2. Customer value as value-in-use

A smaller group of scholars studied customer value within the customer setting (the value-in-use perspective). They maintained that 'real' value is a subjective category that can be experienced only in the phase of usage/consumption (Vandermerwe, 1996) and this is the main distinction and contribution of this group of research scholars. Interestingly, these views are more consistent with SDL/SL and they were important in framing this logic.

Customer value as value-in-use is defined as the **experience[3] of interacting with some product, service or event** (Holbrook and Corfman, 1985). Scholars in this stream consider customer value to emerge during usage (Butz and Goodstein, 1996) or during the 'exposure' to the product after exchange (Mattsson, 1991). Reuter (1986) argues that value is the performance of the product in a given customer application (use). Value is a functional outcome, a goal, purpose or objective that is served directly by the use or consumption of the product or service (Holbrook, 1994; Woodruff and Gardial, 1996).

Customer value as value-in-use was, in several cases, implicitly and explicitly described in a similar way to value-in-exchange in the terms of its key constitutive elements, making the distinction between these two value approaches blurry. Many authors consider that value-in-use also has **benefit and cost** elements (Zeithaml, 1988; Oliver, 1999; Slater and Narver, 2000; Walter et al., 2001; Eggert and Ulaga, 2002). These authors maintain that value is basically what is left after the sacrifices of the consumption/usage experience have been deducted (Ponsonby and Boyle, 2004) – a net benefit. Sometimes when a customer has a bad experience with consuming an offering, the 'sum' of monetary, cognitive, psychic and physiological costs can be greater than any benefits gained from it. This implies that the experience is negative in value-in-use terms. Some of the definitions deliberately tie benefits and costs to the usage situation (Eggert and Ulaga, 2002), while other authors provide value definitions that are not explicit about which strand of value they explore. This is why some of the definitions listed in Table 3 at first appear to be definitions of customer value as value-in-exchange. This is the case with Zeithaml's (1988: 14) definition of value as a "consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given". However, later in the article Zeithaml (1988) clarifies that customer value includes both value-in-use and value-in-exchange strands and she explains the different stages of consumption and their outcomes. For Zeithaml (1988), the positive consequences of a consumer's usage experience are a type of 'emotional payoff'. She considers that emotional consequences have a higher-level impact than monetary or cognitively-based value factors (that is, value based on rational decision making). This adds to the argument that value is subjective and gives more importance to emotional and cognitive aspects of value experience than to bare benefits/costs estimations in the exchange setting (Butz and Goodstein, 1996). Through an exploratory study she found that customers' perceptions of value change according to the different phases of the exchange process (purchase,

[3] An experience can be defined as an event or occurrence which leaves an impression (Pearsall, 1998)

preparation and consumption). On the basis of this work it is clear that value can be also regarded as **multi-staged**. Furthermore, other authors considered **value to emerge in a customer's space** (Vadermerwe, 1996), to be **context-specific** (Woodruff and Gardial, 1996; Woodruff, 1997), **subjective** and **arbitrary** (Mattsson, 1991; Holbrook, 1994). Based on this review, a number of features were found to imply that value-in-use is considered to be a more complex concept than value-in-exchange. Authors mentioned in this section were, in fact, scholars trying to break free from 'goods marketing' (Holbrook and Corfman, 1985; Mattsson, 1991; Swartz et al., 1992; Prahalad and Ramaswamy, 2000; Eggert and Ulaga, 2002). They contended that customer value assessment in the phase of usage/consumption differs from the way value is assessed prior to exchange (see Zeithaml, 1988).

2.4.2. Summary

The main focus of this section was to identify definitions, understand theoretical divergences and convergences and to reflect on the ideas from this period. Within the marketing era before the emergence of SDL, value was studied from many different perspectives (see Table 1). As regards customer value theory particularly, the body of knowledge is rich in definitions and explanations. This literature demonstrates that scholars had two approaches to studying and defining customer value. One approach was to look at customer value as value-in-use and the other as value-in-exchange. Customers were perceived as passive recipients of value, and value was mainly determined in terms of what is given versus what is received (Buttle 1994; Firat and Venkatesh, 1993; Holbrook, 1996; McDonagh and Prothero, 1996; Woodruff, 1997). Value-in-exchange was given more attention in the literature due to the belief that value was a phenomenon that could be fully controlled and managed by the supplier (value as an inbuilt propensity of the market offerings). However, authors largely agree that customers are the ultimate arbiters of value (value as a subjective and arbitrary phenomenon) and this is the main meeting point of scholars studying value-in-exchange and value-in-use. The usage context is considered to have an influence on value, which was largely ignored by the scholars who focused solely on value-in-exchange. Value-in-use conceptualisations provide more focus on the evolving needs and personal preferences of customers. The importance of needs is also present and outlined in the value-in-exchange strand but it tends to be static and presented as part of the purchase process (evaluation of product's or service's features against price at the moment of exchange). On the other hand,

value-in-use is based on the components of context and real needs that have to be satisfied with the product or service in use. Despite the evident differences, both strands consider value to have 'get' and 'give' elements and that the customer is the ultimate arbiter of value. These are the main points of agreement. However, where value emerges remains a point of disagreement.

2.5. Towards the emergence of SDL

A potentially problematic issue is found in attempts to conceptualise value without establishing a wide consensus on how value can be defined. Woodruff and Flint (2006) and Ulaga (2001) contend that the fundamental question of how to conceptualise value still merits further investigation. Moreover, relevant studies have not yet yielded unambiguous interpretations of the complex construct of customer value (Grönroos and Ravald, 2009; Payne and Holt, 2001). According to Landroguez et al. (2013: 236) these problems with the conceptualisation of customer value can be partially explained by the fact that **customer value is** a **complex** (Lapierre, 2000; Ravald and Grönroos, 1996; Woodruff and Gardial, 1996), **polysemic** (Kashyap and Bojanic, 2000; Zeithaml, 1988), **subjective** (Babin et al., 1994; Woodruff and Gardial, 1996), **arbitrary and dynamic** (Day and Crask, 2000; Van der Haar et al., 2001) **concept**. This would suggest that the concept of value is elusive and hard to specify in its entirety. However, Anderson and Narus (1998: 7) disagree, arguing that "studying value can be monumentally difficult, but it can be done". Their main suggestion is that the starting point to study what value is within a certain consumption context, industry or market is the customer. They also contend that companies will have a challenging task in establishing initial value models for their customers, but once an initial model is designed any subsequent improvements are generally much easier.

In the literature reviewed so far, consumption or usage is considered to have no impact on the value of the service or product in the majority of cases (Ponsonby and Boyle, 2004). Simply said, customers were not considered to be a part of value creation, but, rather, were thought to be involved only in value destruction. One of the first articles to challenge the orthodoxies of this period was the article written by Norman and Ramirez (1993). They considered value to be co-produced with customers but only in cases when co-production

was envisaged by the company's business strategy, to integrate customers and their knowledge into the value chain to act as leverage for value creation. However, in this case customers can influence the created value only if they are involved in the production process itself. On the other hand, Prahalad and Ramaswamy (2000) contended that co-production is not a choice for customers, as it always happens when consumption or usage happens. Prahalad and Ramaswamy (2000) had substantially different views on co-production from Norman and Ramirez, in believing it to be in the sphere of consumption. At around this time, Pine and Gilmore (1999) urged a shift to focus on experiences and away from goods, even when tangible products were involved. Gummesson (1993) argued that customers do not buy goods or services but offerings which are vehicles of service provision and thus, value creation. Adding to these developments, a number of authors took the position that value can emerge only in the customer's sphere during usage (Ravald and Grönroos, 1996; Vandermerwe, 1996; Wikström, 1996; Woodruff and Gardial, 1996; Grönroos, 2000; Prahalad and Ramaswamy, 2000; Normann, 2001). All these new and converging ideas resulted in the emergence and framing of SDL.

The following sections will discuss the main ideas and theoretical developments of the SDL and SL literature streams.

2.6. Value in the SDL era

2.6.1. Service-dominant logic

The critical contribution that brought about a serious revision of the GDL' understanding of exchange and value creation was Vargo and Lusch's (2004a) seminal paper "Evolving to a New Dominant Logic for Marketing", which was subsequently refined (Vargo and Lusch, 2006; Vargo and Lusch 2008a, 2008b, 2008c; Vargo et al., 2008, 2009). Until now the paper was cited more than 6,000 times (Google Scholar, 2014). Vargo and Lusch framed a new logic of marketing by bringing together existing notions and some original, unconventional ideas under one theoretical framework. Despite this valuable theoretical contribution, their work was mostly integrative in nature. For example, the idea of the customer as a value co-creator, included by Vargo and Lusch (2008a) as their foundational premise (FP) 6, comes from Prahalad and Ramaswamy (2000); the idea of service as a common denominator of

exchange, included in FPs 2, 3 and 4, comes from Bastiat (1860); while the idea of resource integration, included in foundational premise 9, comes from Normann (2001). All these authors are, of course, acknowledged by Vargo and Lusch (2004a, 2006). However, SDL, as an integrative work, through its FPs (listed in Table 4) sheds a new light on the entirety of marketing.

Table 4: Foundational premises of SDL

FOUNDATIONAL PREMISES		EXPLANATION
FP1	Service is the fundamental basis of exchange.	Service as application of operant resources (knowledge and skills) is the basis of all exchange. Service is exchanged for service.
FP2	Indirect exchange masks the fundamental basis of exchange.	Service is provided through complex combinations of goods, money, and institutions, and is not always apparent as the basis of exchange.
FP3	Goods are distribution mechanism for service provision.	Goods (both durable and non-durable) derive their value through use and the service they provide.
FP4	Operant resources are the fundamental source of competitive advantage.	The comparative ability to cause desired change drives competition.
FP5	All economies are service economies.	Service (singular) is only now becoming more apparent with increased specialisation and outsourcing.
FP6	The customer is always a co-creator of value.	Value creation is interactional.
FP7	The enterprise cannot deliver value, but only offer value propositions.	The firm can offer its applied resources and collaboratively create value following acceptance, but cannot create or deliver value alone.
FP8	A service-oriented view is inherently customer oriented and relational	Service is defined in terms of customer-determined co-created benefit and it is inherently customer oriented and relational.
FP9	All social and economic actors are resource integrators.	The context of value creation is networks of resource-integrators.
FP10	Value is always uniquely and phenomenologically determined by the beneficiary.	Value is idiosyncratic, experiential, contextual, and meaning laden.

Source: Vargo and Lusch (2008a: 7)

2.6.2. Service logic

SL as a critique of SDL, was established by Grönroos in 2006 (Heinonen and Strandvik, 2009). Similar to SDL, SL has 10 foundational principles (see Table 5). The fundamental purpose of both SL and SDL is the same: to acknowledge the importance of service and the interface between service providers and customers (Grönroos and Gummerus, 2014). SL and SDL share views on: (a) service as the only means of exchange; (b) resource based approach to value creation; and (b) value-in-use as a 'true' value and logic for explaining value. However, there some points of divergence and areas of open SDL-SL debates.

Table 5: SL principles

SERVICE LOGIC PRINCIPLES	
1	In a value generation sphere closed to the service provider (a customer's sphere), customers/users create value in the form of value-in-use by integrating new resources with existing resources and applying previously held knowledge and skills
2	Value (as value-in-use) evolves in a cumulative process, or is sometimes destroyed, throughout the customer's value-creating process
3	Value (as value-in-use) is uniquely, experientially and contextually perceived and determined by customers
4	Firms as service providers are fundamentally value facilitators in a value generation sphere closed to the customer (a provider sphere), such that they develop and provide potential value-in-use for customers and other users
5	If a platform of co-creation exists or can be established through direct interactions among actors in the value generation process, the service provider can engage with customers' value creation, and opportunities for co-creation of value among actors arise
6	Between the customers and individuals in their ecosystem, social value co-creational activities that influence the customers' independent value creation process may take place
7	Service is the use of resources in a way that supports customers' everyday practices – physical, mental, virtual, possessive – and thereby facilitate their value creation
8	The goal of marketing is to engage the service provider with customers' processes to enable reciprocal value creation among the actors, with service as a facilitator
9	As service providers, firms are not restricted to making promises through value propositions
10	In direct interactions, using a platform of co-creation firms as service providers can directly and actively influence customers' value fulfilment and thereby keep promises made, as well as contribute to the establishment and maintenance of customer relationships, marketing is extended beyond a predominantly promise making function

Source: Grönroos and Gummerus (2014: 207–208)

Despite its immense contribution to marketing thought, SDL has been criticised for being more of a metaphor (Grönroos, 2012) or grand/general theory lacking explicit theorisation (Leroy et al., 2013). Added to this, in the decade following its emergence, SDL is considered to have "little meaning to practicing managers" (Brodie, 2014: 88). The key reason for that might be found in the fact that in SDL all economic and social actors are resource integrators (Vargo and Lusch, 2006, 2008a) and consequentially value co-creators (Akaka and Chandler, 2011) (see FP6 and FP9 in Table 4). This broadened scope for value creation includes almost everything that has some impact on the resources employed in use and value creation outcomes (Vargo, 2008). Based on these grounds, SDL has been criticised for creating all-inclusive conceptualisations of value outcomes and value creation processes which is argued to have rendered the focus of value creation unclear (Gummerus, 2013; Grönroos and Gummerus, 2014). "When viewing value creation as an all-encompassing process, co-creation becomes a metaphor – everything is co-creation, everybody co-creates – that does not allow for further analytical developments" (Grönroos and Voima, 2013: 137). In contrast to SDL's understanding of value co-creation, in SL, value co-creation is only a specific form of value creation that requires customer and supplier to directly interact and co-operate in a joint value creation process (Grönroos 2008, 2011a). Outside of this joint customer-supplier sphere, a supplier can act only as a value facilitator through offerings they provide to customers, while customers can also take on the roles of independent value creators with no direct interaction with the supplier.

SDL is focused on service (eco-)systems, network-to-network interactions (Akaka and Vargo, 2014; Vargo et al., 2008; Vargo, 2008) and the customer-supplier dyads (Moeller, 2008; Roggeveen et al., 2012; Hilton and Hughes, 2013). On the other hand, SL is urging further focus on understanding what happens in the domain of the customer and shifts the scope of value creation from a provider driven, all-encompassing process to a customer-driven value creation process (Grönroos and Voima, 2013; Grönroos, 2008, 2011a). Some even argue that SDL is still not sufficiently customer-focused, but rather represents a more advanced company-based view, where the customer is seen as employed by the company or as a partner in co-creation (Heinonen et al., 2010). In their critique of SDL's supplier-centric view of marketing, Grönroos and Gummerus (2014: 208) argue that "the goal of marketing is to engage the service provider with customers' processes to enable reciprocal value creation among the actor". This suggests that the aim of marketing is to gain access to the customer's

sphere. In light of this focus, SL is sometimes referred to as *customer-dominant marketing and business logic* (Heinonen et al., 2010). Given this knowledge, this doctoral study was aligned with SL views especially recognising the urge to study value creation from the customer's perspective establishing clear boundaries of the domains of value creation and value co-creation.

In SDL and SL, *service* as a common denominator of exchange, *value* and *value creation* are closely related and so difficult to study separately. Therefore, in the following sections, while the aim will be to discuss each of these concepts individually, in some places this will not be possible. Furthermore, given that SL and SDL scholars are still debating how to conceptualise some of the key constructs such as value, value creation, resource integration etc., the following sections will not be discussed taking separate SDL and SL perspectives rather a joint approach will be taken pointing to places under debate and divergences between these two sister logics where appropriate.

2.6.3. Service

Vargo and Lusch (2008a) argue that 'service' is the logic for understanding value creation and marketing. Service, in SDL and SL, is considered to be a common denominator of exchange, thus making the traditional (GDL) division between products and services less relevant. 'Service' is *not* equivalent to 'services' (a form of company output), rather service is defined as "the application of specialized competences (knowledge and skills), through deeds, processes, and performances for the benefit of another entity or the entity itself" (Vargo and Lusch, 2004a: 2) and the means to reach desirable end states (Gummerus and Pihlström, 2011). Furthermore, "service is the use of resources in a way that supports customers' everyday practices – physical, mental, virtual, possessive – and thereby facilitate their value creation" (Grönroos and Gummerus, 2014: 208). Simply said, service is the outcome of resources applied in use (Vargo and Lusch, 2012).

GDL does not have a common denominator of exchange but instead a dominant form, namely goods, and 'inferior' or subordinated form that of services. In GDL, services were defined residually as being imperfect goods with features of inseparability, perishability,

intangibility and heterogeneity (Zeithaml et al., 1985). Vargo and Lusch (2004b) and Lovelock and Gummesson (2004), however, refuted these four criteria by which services can be differentiated from products. They show that these features are equally applicable to goods, since services often have tangible results while tangible goods are often heterogeneous. Furthermore, customers are always inseparable from the consumption and creation of value-in-use, and goods are as perishable as services. These arguments helped to develop a view that the goods/services distinction using the criteria of inseparability, perishability, intangibility and heterogeneity is a fallacy. Therefore, service-based logics overcome debates on the imperfection of services and make any residual definitions of services obsolete, by considering both goods and services to have *service* as a common denominator (Vargo and Lusch, 2004b). However, this view of service by no means makes SDL and SL anti-goods or against tangible matter in exchange and/or consumption. On the contrary, goods and tangible resources play an important role in service based logics as appliances or vehicles in the customer's service-provision 'supply chain' (Lusch, 2011). Goods are regarded as the distribution mechanism for service provision, because of their ability to 'contain' or 'carry' operant resources (knowledge and skills), as these enable the service (Vargo and Lusch, 2008a). As Lusch and Vargo (2006a: 282) argue, "there is no good-versus-service winner or loser in S-D logic". Rather, service is regarded as a common denominator of exchange and a "perspective on value creation" (Edvardsson et al., 2005: 118).

2.6.4. Value-in-use

In SDL and SL value-in-use represents 'actual' value that is experienced and assessed by customer in consumption, in contrast to value-in-exchange, which is considered to be a GDL notion of value expressed in monetary terms or price or transactional value (Echeverri and Skålén, 2011; Vargo et al., 2008; Lusch, 2011) or potential value (Grönroos and Gummerus, 2014). Value-in-use, as a holistic experience, is considered to be 'true' value (Vargo and Lusch, 2008b) which is derived through an interaction with the firm and its offerings, through the process of service creation itself, as well as through the possession of particular resources (Heinonen et al., 2010; Grönroos 2006, 2008). SDL/SL regard offering as value propositions that do not have an inbuilt value per se. Rather the value of the offerings is only 'perceived' before it is consumed/used by the customer. In the most orthodox customer-

centric view, SL authors Grönroos and Gummerus (2014) argue that value-in-use is the only form of value, given that value-in-exchange is only potential value that is yet to be realised as real value (i.e. as value-in-use). This approach to the relationship between value-in-use and value-in-exchange, offers a key insight as to why so many authors (Grönroos and Gummerus, 2014; Vargo and Lusch, 2006, 2008b; Vargo, 2008, 2009; Lusch et al., 2008; Holbrook, 2006) use the term value when they are, in the fact, referring to and describing the concept of value-in-use. In contrast to GDL, SDL and SL take value completely into the sphere of usage and consumption, and give customers the more important role in terms of value creation. According to SDL view (Vargo and Lusch, 2004a, 2011) customer and supplier are equal value co-creation actors. In SL, on the other hand, the customer is seen as the key protagonist of value creation, while suppliers can co-create value only when interacting with a customer (Grönroos and Voima, 2013; Grönroos, 2008, 2011b). The divergence between SDL and SL is in what is defined as the domain/sphere where value can emerge. In the case of SDL it is the joint customer-supplier sphere, while SL also includes the customer's private domain free of direct interactions with suppliers (Grönroos, 2008, 2011a).

In the range of identified definitions and descriptions of value (see Table 6), it is evident that authors usually focus on one dimension of value. Paying closer attention to these definitions, it is clear that there is usually one noun followed by several attributes. For example, value is generally defined/described as ***experience*** (Helkkula et al., 2012; Ng and Smith, 2012; Vargo and Lusch, 2006; 2008b; Holbrook, 2006; Sandström et al., 2008; Vargo, 2009; Ramaswamy 2011; Voima et al., 2010), ***benefit*** (Vargo and Lusch, 2012; Vargo, 2009; Grönroos, 2008), and **outcome** (Woodruf and Flint, 2006; Macdonald et al., 2011) or a ***consequence of the used service*** (Gummerus and Pihlström, 2011; Lusch and Vargo, 2006; Payne et al., 2008; Xie et al., 2008; Ng et al., 2010). Value-in-use is, therefore, not realised until the service is consumed/experienced and appears as a function of the holistic consumption experience (Grönroos, 2008; Grönroos and Ravald, 2011; Heinonen et al., 2010; Helkkula et al., 2012; Strandvik et al., 2012; Voima et al., 2011). Despite the benefit side of value being extensively emphasised, recent publications also take the ***sacrifice***[4] component of value-in-use into account (see Mohd-Any et al., 2014; Aarikka-Stenroos and Jaakkola, 2012; Mayr and Zins, 2012; Lemke et al., 2011; Heinonen and Strandvik, 2009). However, to date proponents of this view are few. Adding to value definitions, the SDL/SL literature is rich with descriptors of value. Value is described as ***perceptual*** (Hilton and Hughes, 2013; Vargo and Lusch, 2006,

[4] Alternatively referred to as efforts or costs

2012), ***processual*** (Lemke et al., 2011), ***episodic*** (Roggeveen et al., 2012; Verhoef et al., 2009), ***context-dependent*** (Grönroos and Gummerus, 2014; Karababa and Kjeldgaard, 2013; Chandler and Vargo, 2011; Vargo et al., 2010; Vargo, 2008; Edvardsson et al., 2011; Helkkula et al., 2012; Epp and Price, 2011; Gummesson, 2006; Grönroos and Voima, 2013), ***interactive or relational*** (Holbrook, 2006; Tynan et al., 2009), ***intangible*** (Vargo and Lusch, 2008b), ***idiosyncratic*** (Vargo, 2008, 2009), ***intrinsic*** (Ranjan and Read, 2014; Ballantyne and Varey, 2006), ***subjective*** (Echeverri and Skålén, 2011; Vargo and Lusch, 2008b), ***dynamic*** (Voima et al., 2011; Grönroos and Voima, 2013) and ***potentially perishable*** (Vargo and Lusch, 2008b), ***socially constructed*** (Karababa and Kjeldgaard, 2013; Edvardsson et al., 2011; Lemke et al., 2011), ***phenomenological*** (Lemke et al., 2011) and ***experiential*** (Grönroos and Gummerus, 2014; Hilton and Hughes, 2013; Vargo and Lusch, 2006, 2008b; Vargo, 2009; Grönroos, 2008; Grönroos and Ravald, 2011; Heinonen et al., 2010; Helkkula et al., 2012; Strandvik et al., 2012; Voima et al., 2011).

In describing value as intangible and perishable, Vargo and Lusch (2008b) drew a clear delineation in the understanding of the value concept compared with that held in the GDL literature, where value was understood as embodied in goods (tangible) and produced/delivered exclusively by suppliers. The idiosyncratic, perceptual, intrinsic and dynamic nature of value suggests that it may be defined by each customer in a unique way, and different offerings may have different meanings to different customers or different meaning at different points in time to the same customer. Value explained as experiential means that value is the outcome of cognitively/rationally and affectively/emotionally evaluated use experiences (Heinonen et al., 2010) and situations in which customers realise that they got better off in some aspect (Grönroos and Voima, 2013). Furthermore, value-in-use is argued to occur in episodes (episodic value) which imply that value-in-use can be observed in separated consumption events (Roggeveen et al., 2012; Verhoef et al., 2009). Literature recognises value in the context of extended social systems or networks (Edvardsson et al., 2011; Epp and Price, 2011; Gummesson, 2006; Grönroos and Voima, 2013; Lemke et al., 2011; Vargo et al., 2010). It is also argued that the context itself moderates, impacts and determines the customer-offering interaction and value. Edvardsson et al. (2011) argue that value-in-use is learned by customers through the process of ongoing internalisation and externalisation via interpersonal interactions. Basically, consumption is learned in social contexts. Groups of customers can serve as a proxy for value judgements and can also jointly co-create and arbitrate value (Iglesias et al., 2013). Some authors suggest

that the term value-in-social-context is more appropriate than value-in-use. Despite this contention being true, emphasising social context is not really seen to be necessary, as it is known that customers are an inseparable part of wider social, physical and cultural contexts.

Adding to the problem of the complexity of value-in-use as a theoretical concept, operationalization of the value construct (in a form that is suitable for further theoretical and empirical application) was also a challenging task for scholars (Heinonen and Strandvik, 2009). Namely, value-in-use is argued to be a **multidimensional** and **multifaceted construct** (Lindgreen et al., 2009; Lindgreen and Wynstra, 2005; Aarikka-Stenroos and Jaakkola, 2012; Pongsakornrungslip and Schroeder, 2011; Pihlström and Brush, 2008; Turel et al., 2007). However, there is currently a lack of consensus as to what the elements or dimensions or antecedent constructs of value are (Mohd-Any et al., 2014).

Table 6: Value definitions and attributes in the SDL and SL literature

PUBLICATIONS	VALUE DEFINITIONS AND VALUE FEATURES
Holbrook (2006: 212)	*"Value is an interactive relativistic preference experience."*
Vargo and Lusch (2006: 44)	*"Value is a perceptual and experiential category."*
Vargo and Lusch (2006: 50)	*"Value is a joint function of the actions of the provider(s) and consumer(s)."*
Woodruff and Flint (2006)	*Value in use is a customer's functional and/or hedonic outcome, purpose or objective directly served through usage*
Grönroos (2008: 303)	*"Value for customers means that after they have been assisted by a self-service process or a full-service process they are or feel better off than before."*
Lusch et al. (2008: 5)	*"Value is a collaborative process between providers and customers."*
Sandström et al. (2008:112)	*"Value-in-use is the cognitive evaluation of the service experience. …service experience is the total functional and emotional value of a consumed service."*
Vargo (2008: 212)	*"Value is a customer-determined and co-created benefit."*
Vargo and Lusch (2008b: 28)	*"Value is always intangible, heterogeneously experienced, co-created and potentially perishable."*
Vargo (2009: 375)	*"Value is idiosyncratic, experiential, contextual, and meaning laden."*
Heinonen et al. (2010)	*Value in use is what consumer cognitively (rationally) and affectively (emotionally) experienced in use*
Edvardsson, Tronvoll and Gruber (2011: 333)	*Value has a collective and inter-subjective dimension and should be understood as value-in-social-context.*
Gummerus and Pihlström (2011)	*Value-in-use is a consequence of used service*
Lemke et al. (2011: 849)	*"Value-in-use may be utilitarian, hedonic or a mixture of the two… [and] since value-in-use is phenomenological, it is inherently processual, potentially varying over time through the customer journey."*
Macdonald et al. (2011: 671)	*Value-in-use is "a customer's outcome, purpose or objective that is achieved through services"*
Helkkula, Kelleher and Pihlström (2012: 3)	*"Value in the experience is the value that is directly or indirectly experienced by service customers within their phenomenological lifeworld contexts."*
Vargo and Lusch (2012: 2)	*"Value relates to the benefit(s) for some actor(s) and these premises suggest that value is co-created through the establishment of new resources, from the resources provided by multiple sources (and their application, through service) and that it cannot be assessed except from the perspective of some beneficial actor, in the context of their other available resources."*
Grönroos and Voima (2013: 144)	*"We define value as value-in-use, created by the user (individually and socially), during usage of resources and processes (and their outcomes)"*
Hilton and Hughes (2013: 868)	*"Value is a function of the perceived outcome of the transaction and the resource integration experience. It goes beyond utilitarian value and includes emotional and social value"*
Grönroos and Gummerus (2014: 207)	*"Value is uniquely, experientially and contextually perceived and determined by customers"*

The GDL literature is significantly richer than SL and SDL in models that operationalise value concept. Here, value was studied as either a unidimensional, cognition-based perception, or as a multidimensional construct that combines cognitive and emotive value elements (Sánchez-Fernández and Iniesta-Bonillo, 2007). The former unidimensional models are more parsimonious, but the later models have been particularly encouraged in literature, because they better capture the emotional, intangible, and intrinsic value dimensions that are important in many consumption settings (Lin et al., 2005; Sánchez-Fernández and Iniesta-Bonillo, 2007; Gummerus and Pihlström, 2011).

Operationalising the value construct in both SL and SDL has been more of a theoretical than empirical challenge, with the majority of publications drawing on anecdotal data (Echeverri and Skålén, 2011). The general approach to the operationalization of value is to have one overall value dimension with several antecedent (lower-order) constructs (e.g. Kim et al., 2007; Kleijnen et al., 2007; Vlachos and Vrechopoulos, 2008). On the other hand, some studies simultaneously use several co-existing value dimensions (e.g. Pihlström and Brush, 2008; Turel et al., 2007). However, parsimonious solutions can only be achieved with the former approach i.e. when the overall abstraction of perceived value is conceptualised within the model and is specified as formative in the second-order (Lin et al., 2005).

A large number of articles that conceptualise value as a multidimensional constructs recognise **instrumental value**[5] (Sandström et al., 2008; Lemke et al., 2011; Gummerus and Pihlström, 2011; Nordin and Kowalkowski, 2010; Zhang, 2014; Hilton and Hughes, 2013; Mohd-Any et al., 2014; Tynan et al., 2009; Smith and Colgate, 2007), **experiential value**[6] (Sandström et al., 2008; Lemke et al., 2011; Gummerus and Pihlström, 2011; Nordin and Kowalkowski, 2010; Mohd-Any et al., 2014; Williams and Soutar, 2009; Tynan et al., 2009), **symbolic value**[7] (Gummerus and Pihlström, 2011; Hilton and Hughes, 2013; Gummerus and Pihlström, 2011; Tynan et al., 2009) and **monetary value** (Gummerus and Pihlström, 2011; Nordin and Kowalkowski, 2010; Aarikka-Stenroos and Jaakkola, 2012). Finally, **sacrifices** dimension has been recently included in an operationalised value-in-use construct in a few SL publications (see Aarikka-Stenroos and Jaakkola, 2012; Heinonen and Strandvik, 2009; Mohd-Any et al., 2014) and SDL publications (see Tynan et al., 2009). Instrumental value is

[5] Alternatively referred to as functional or utilitarian value
[6] Alternatively referred to as emotional or hedonic value
[7] Alternatively referred to as social or esteem value

derived from the effective task/problem fulfilment and satisfaction of customer's extrinsic requirements using physical resources (Zhang, 2014; Childers et al., 2001) and stands for "the extent to which a service has desired characteristics, is useful, or performs a certain function" (Smith and Colgate, 2007: 10). The experiential value provides the non-physical features and may also include mental images, brand reputation and themes (Sandström et al., 2008; Normann, 2001; Rafaeli and Vilnai-Yavetz, 2004), that is "the extent to which service creates appropriate experiences, feelings and emotions for the customer" (Smith and Colgate, 2007: 10). Symbolic value represent those benefits which satisfy the customer's requirement for social recognition, esteem, fashion, aesthetics and sociability (Zhang, 2014; Williams and Soutar, 2009; Sigala, 2006; Hibbert et al., 2012). In other words it is "the extent to which customers attach or associate psychological meaning to a service" (Smith and Colgate, 2007: 10). Monetary value, mentioned in a number of publications which focus on B2B context, is reflected in improved financial performance as well as cost saving for the customer (Gummerus and Pihlström, 2011; Nordin and Kowalkowski, 2010; Aarikka-Stenroos and Jaakkola, 2012). Sacrifices span over a range of efforts that customer has to invest in order to enjoy the benefits. Some of the sacrifices mentioned are **user's cognitive effort** (Mohd-Any et al., 2014; Smith and Colgate, 2007), **the complexity of using a resource** (Kleijnen et al., 2007; Mayr and Zins, 2012), **exclusivity and rarity** (Tynan et al., 2009) as well as **monetary, effort and time sacrifices** (Aarikka-Stenroos and Jaakkola, 2012; Smith and Colgate, 2007).

Finally, Ng and Smith (2012) argue that SDL and SL do not distinguish sufficiently between **phenomenal consciousness value** (lived experience, stemming from the use of the actual offering) and **access consciousness value** (value through perception, introspection, and reflection). They argue about the paradox of value in which any experienced value (actual value) immediately becomes access consciousness value or a mere perception/recollection about the actual value. This means that any measurement, operationalization, assessment, judgement or evaluation of value, even by the individual themselves, can only capture the perceptual value, and not the actual value. In line with this view, this research acknowledges that the only value a researcher can explore and measure is the access consciousness value. This means that value can only be studied as a perceptual and subjective category or the customer's recollection of what has been a lived value experience.

2.6.5. Resources

In both SDL and SL value is **created in use through the application of resources** (Grönroos and Gummerus, 2014; Grönroos and Voima, 2013; Vargo and Lusch, 2012). This is why resources have been given such a central place in SDL and SL. Madhavaram and Hunt (2008) define resources as the tangible and intangible entities available for value creation. Håkansson et al. (2009) state that the resources are frequently the basis of an interaction between individual actors (customers, suppliers) and are the object of change and activation. A resource represents a carrier of capabilities, enabling an intended activity only when used (Fischer et al., 2010). Peters et al. (2014) view resources as heterogeneous and highly dynamic functional concepts emphasising their emergent nature (i.e. resources are not, they become from entities into resources once they are recognised as useful for value creation). Thus, resources may not only become, but conversely specific resources can cease to act as resources when they are no longer utilised in value-creating processes (Löbler, 2013). Simply said, all entities have potential value, but what activates or deactivates them as resources is context or suitability for use (Grönroos and Ravald, 2009) and customer choices with regard to preferences and particular consumption contexts. For example, oil was not recognised as a useful resource until the internal combustion engine was invented.

The SDL/SL literature distinguishes between **operant** and **operand** resources (Vargo and Lusch, 2004a). Operant resources are generally intangible resources such as knowledge, skills, motivation which are able to act on operand resources. Operand resources themselves include tangible resources such as raw materials, land, animal life, plant life, minerals and other natural resources which are acted upon by operant resources and transformed by them (Vargo, 2008; Vargo and Lusch, 2004a; Vargo et al., 2008). Operant resources are those that produce effects, and can be further classified as ***physical***, ***social*** and ***cultural resources*** (Baron and Harris, 2008; Arnould et al., 2006). According to Baron and Harris (2008) and Arnould et al. (2006) physical resources are energies, emotions and strength; social resources are networks with others, including family relationships, brand community, customer tribes and business relationships; and cultural resources are professional knowledge and skills, history and imagination (Gummerus, 2013). From the perspective of a company Madhavaram and Hunt (2008) define operand resources as typically physical, and operant resources as typically human, organisational, informational and relational. The latter are considered the main source of company's competitive advantage (Vargo et al., 2006;

Vargo and Lusch, 2006). Customers and actors integrate operand and operant resources made available to them by various providers, through service provision, with their own personal resources in the context of their own lives, to create or co-create value (Ng and Smith, 2012).

There are fundamental preconditions for resource integration, including actors possessing the ability and capacity to use or integrate a resource (Kleinaltenkamp et al., 2012). When customers have insufficient personal resources, they turn to resources afforded by organisations and other network actors (Hibbert et al., 2012) which usually leads to exchange. On this basis, resources can be classified according to their ownership as either **customer's** or **supplier's resources** (Hilton and Hughes, 2013; Aarikka-Stenroos and Jaakkola, 2012; Moeller, 2008). In line with the classification or resources according to ownership, Vargo and Lusch (2011) distinguish sources as **private** (resources owned), **market-facing** (resources intended for exchange) and **public** (resources not owned by anyone but accessed freely such as air, sunlight etc.). This indicates that certain resources inherently require exchange to be accessed. Public resources are closely related to contextual resources. However, context, as an apparently operand resource, has not been sufficiently recognised as a resource, but only as a surrounding (background) of value creation. As previously discussed, value is social- and physical-context dependent (Vargo, 2008; Helkkula et al., 2012; Edvardsson et al., 2011). Context influences value creation through resources, thus it is an important dimension of value creation or co-creation because it frames exchange, service (Heinonen, 2004; Pihlström and Brush, 2008; Pura, 2005) and the potentiality of resources (Vargo and Lusch, 2012: 120). Context can be ultimately defined as a resource constellation that is available for customers to enable value creation (Edvardsson et al., 2012: 419) and therefore can also be regarded as a resource and input in value creation (Chandler and Vargo, 2011). If the context changes the value-in-use might change as well (Gummerus and Pihlström, 2011).

2.6.6. Value creation and resource integration

Any attempt to conceptualise value creation or to define what it entails, along with where, how, by whom, and when is value created, brings out the complexity of the value creation

concept (Voima et al., 2010). A major portion of the previous research on value creation is conceptual and abstract (Echeverri and Skålén, 2011) with few empirical exceptions (see Aarikka-Stenroos and Jaakkola, 2012; Echeverri and Skålén, 2011; Schau et al., 2009; Tynan et al., 2009; Moeller, 2008; Xie et al., 2008). Hibbert et al. (2012) see value creation as *customers' activities* that are instrumental to achieving value. According to Grönroos and Voima (2013) value creation is more precisely seen as the customer's process of extracting value from the **usage of resources** (Grönroos and Gummerus, 2014) and a process in which the customer's well-being is increased, so that the customer becomes better off in some respect (Grönroos, 2008; Nordin and Kowalkowski, 2011; Vargo et al., 2008). Value implies customer's usage over time (Helkkula and Kelleher, 2010; Sawhney et al., 2006; Strandvik et al., 2012; Tuli et al., 2007) and this involves resource integration as a means to create service (Grönroos and Gummerus, 2014; Saarijärvi et al., 2013)**.** Saarijärvi et al. (2013) argue that value co-creation captures the activity, the mechanism through which the resources provided by different actors are integrated into the value creation processes and then developed into value-in-use. Saarijärvi et al. (2013) distinguished between customer's value co-creation mechanisms (such as refining and returning customer data to customers) and firm's value co-creation mechanisms (such as co-production, co-design and co-development). However, value co-creation has still not been analysed sufficiently rigorously while recent literature lacks a consistent understanding of the nature of value creation, its determinants and mechanisms (Saarijärvi et al., 2013; Grönroos and Voima, 2013). Added to this, SDL has been extensively criticised for being metaphorical, lacking explicit theorisation and hindering theoretical progress by having an all-inclusive conceptualisation of value co-creation in place (Gummerus, 2013). When something (i.e. value co-creation) is defined as everything, it easily becomes nothing. This is why value co-creation is argued to be a 'black box' (Leroy et al., 2013; Grönroos, 2011b) and a concept that is yet to be fully revealed and understood.

Value co-creation is at the heart of an ongoing scholarly debate and one of the key grounds for the SDL-SL bifurcation (Hilton and Hughes, 2013). Notably, a large portion of SDL literature postulates that **value is co-created** (Vargo and Lusch, 2012, 2008b, 2006; Vargo, 2008). Customers co-create value together with other actors (suppliers, customers etc.) out of the resources offered by suppliers and resources they inherently have at their disposal or have access to (Vargo and Lusch, 2012). Vargo and Lusch (2008a) contend that **co-creation is the only way value can be created**; thus, value creation can be performed only by bringing together different parties/actors and their resources. This inconsistence on parties working

jointly to co-create value, has potentially led to the term being commonly misunderstood for co-production (a problem of SDL lexicon). Vargo (2008) emphasised that **co-production** is only a special case of co-creation and a term reserved for participation in the development of the core offering itself, whereas co-creation in SDL was intended to capture the collaborative nature of the process. However, this mainstream SDL's understanding of value co-creation has been challenged by SL scholars (see Grönroos 2009, 2011a, 2011b; Grönroos and Ravald, 2009; Cova et al., 2011; Grönroos and Gummerus, 2014; Grönroos and Voima, 2013). Grönroos (2011b) found logical flaws in SDL's foundational premises – in particular a conflict between FP7 (*The enterprise/supplier cannot deliver value, but only offer value propositions*) and FP6 (*The customer is always a co-creator of value*). If value is always co-created between multiple parties, than FP6 indirectly implies that the supplier is a value co-creator as well as the prefix 'co-' points to collaboration and interaction between at least two parties, and the question becomes how can supplier co-create something they cannot deliver (Grönroos, 2011b). Therefore, according to SL authors, without interaction with the customer, a supplier can act only as a value facilitator. SL goes further in emphasising importance of customer's domain by arguing that "value-in-use is customer driven and accumulates over time in the customer's sphere, which means that value is created in different spatial and temporal settings" (Grönroos and Voima, 2013: 136). In this way, SL is argued to have a broader scope when compared to SDL.

On the basis of interaction theory, SL founder Grönroos (2011b) defines two possible types of value creation: ***value co-creation***, where both the supplier and customer share the value creation process and jointly integrate resources (at the same time being able to influence each other's resource integration practices) and ***customer's independent value creation***, a customer-driven process where the customer integrates resources without a supplier's direct involvement, generating value in a self-service process (Hayslip et al., 2013). In the latter case, a supplier takes part in the value supporting process, labelled as value facilitation, in which resources for a customer's use are developed and deployed but the supplier is not engaged in the value creation process. In another words, there is no physical presence of the supplier in customer's consumption. Given the ongoing debate on value co-creation and the problematic lexicon, this work will employ value creation terms according to the SL view which appears to offer more precision.

Current literature recognises that value creation is an **iterative** (Grönroos, 2008; Nordin and Kowalkowski, 2011; Vargo et al., 2008; Ng and Smith, 2012; Warde, 2005; Vargo and Lusch, 2012) **goal driven process** (Lemke et al. 2011; Epp and Price, 2011; Grönroos and Voima, 2013; Gummerus and Pihlström, 2011; Piacentini et al., 2013) involving **resources** (Grönroos and Gummerus, 2014; Grönroos and Voima, 2013; Vargo and Lusch, 2012)**, actors** (Saarijärvi et al., 2013; Vargo, 2008) and **activities** (Hibbert et al., 2012) such as **resource integration** (Grönroos and Gummerus, 2014; Saarijärvi et al., 2013; Grönroos and Voima, 2013).

The literature recognises customers, suppliers and network actors as value creation actors (Schau et al., 2009). In contrast to SDL, SL allows the understanding that customers can create value on their own. Other actors, according to SL view, are optional in the value creation process. Considering how customers create value, scholars have come to regard them as resource integrators (Hibbert et al., 2012). In SDL, **resource integration** is described as the 'activities' in which multiple actors can participate and apply "uniquely configured resources" (Vargo, 2008: 214). Customer resource integration refers to ''the processes by which customers deploy their resources as they undertake **bundles of activities that create value** directly or that will facilitate subsequent consumption/use from which they derive value'' (Hibbert et al., 2012: 248). In this SDL, each actor is its own primary resource integrator but can also integrate resources in partnership with other entities (Ng and Smith, 2012). Sirmon et al. (2007) consider resource integration to be a process in which resources are deployed and shaped into capabilities. Service provision implies the ongoing combination of resources, through their integration, and application (Vargo et al., 2010); hence the central role of resource integration is the means through which resource integrators (actors) create value (Kleinaltenkamp et al., 2012). Therefore, service as the sum of integrated resources, is a step which occurs before evaluation and value creation (see Exhibit 1 in Appendix 1). Interestingly, resource integration is occasionally treated as synonymous with value creation and there is lack of distinction between the two and/or lack of explanation as to how the two are related to each other (see for example Hilton and Hughes, 2013; Kleinaltenkamp et al., 2012). An appropriate illustration for this similarity of description comes from Vargo (2008: 214) who argues that "firm activity is best understood in terms of input for customer's resource-integrating, value creation activities". In this case value creation and resource integration appear to be treated as equivalents. According to Peters et al. (2014) resource integration represents a continuous process, defined as 'a series of activities performed by an actor' for the benefit of another party, which is conceptually

aligned with Vargo and Lusch (2004a) definition of service. This would imply that resource integration is equal to service creation. Liu and Cai (2010) were more specific, proposing that resource integration includes identifying, obtaining, integrating and utilising resources which implies that resource integration is a multistage process. However, the problem here is in using the term resource integration to define itself. Most likely Liu and Cai (2010) wanted to define value creation, but a misconception may have arisen given this unclear delineation between resource integration and value creation. Vargo et al. (2010) argue that operand resources are often integrated in the value co-creation process by all service systems. Here, Vargo et al. (2010) indicated that value creation is superpositioned to resource integration i.e. – resource integration is most likely a sub process within value creation. Furthermore, when explaining resource integration Vargo (2008) mentions uniquely configured resources, which might imply activities that precede resource integration. Other authors, such as Arnould et al. (2006) and Lusch and Vargo (2006), indicated that co-creation includes more sub-processes such as: resource interaction, integration, and transformation, meaning that value co-creation might be a truly complex multistage process. In this light, Vargo's (2008) resource configuration is not necessarily equal to integration, but rather this can be seen as a preparatory activity. Thus, it is possible to conclude, in line with the view of Peters et al. (2014) and Vargo et al. (2010), that value creation is made of heterogeneous and distinctive activities, implying that the value creation process could be made up of more than just resource integration.

2.6.6.1. Models of value creation

More recently there have also been a few empirical and conceptual attempts, in both SDL and SL, to establish value creation models. Moeller (2008) applies a company-centric (B2C) view and considers customers as resources that companies can integrate in their value creation process. Moeller (2008: 2002) defines customer integration as "combining customer resources (persons, possessions, nominal goods, and/or personal data) with the company resources, in order to transform customer resources". She then argues that service provision (i.e. service creation) consists of facilities (i.e. resources and decisions), transformation of resources and usage (see Exhibit 2 in Appendix 1). The three stages are connected with the potential value (of facilities/resources), transformation (value-in-transformation) and use (value-in-use). Resource transformation is, thus, broader than resource integration given that it includes combination of resources and resources integration.

Aarikka-Stenroos and Jaakkola (2012) define value co-creation as a joint problem solving process that should result in the optimal value-in-use. Their value co-creation model consists of five processes (see Exhibit 3 in Appendix 1). The model acknowledges value co-creation as a goal driven non-linear process. Furthermore, they identified the organisation of processes and resources as a phase that contains identification, activation, collection and integration of relevant resources to make value creation possible. From this perspective it appears that resource integration is just one of the many processes involved in value creation and that resource integration is not equal to value creation. Their findings also indicate that the process of value creation does not necessarily have to progress in a linear fashion.

McColl-Kennedy et al. (2012: 370) define customer value co-creation as a ‘‘benefit realized from integration of resources through activities and interactions with collaborators in the customer’s service network”. However, this study was to a large extent, focused on the value creation practices of customers in their own private setting. These practices are identified as ‘team management’, ‘insular controlling’, ‘partnering’, ‘pragmatic adapting’, and ‘passive compliance’ (see Exhibit 4 in Appendix 1). McColl-Kennedy et al. (2012) argue that customers contribute to the co-creation of value through their own (self-generated) activities.

In their empirical-based article, Payne et al. (2008) applied a process-based approach in studying value co-creation (see Exhibit 5 in Appendix 1). Payne et al. (2008) mapped value creation processes from the perspective of customer-supplier encounters (the customer-supplier dyad). According to them the customer value co-creation process includes the procedures, mechanisms, activities and interactions that support the co-creation of value. However, in their study it was not apparent at what point resource integration took place, and at what stage(s) value was deemed to emerge.

Hilton and Hughes (2013) explore value and value co-creation in a self-service technology (SST) environment. The study recognises types of resources that are inputs to resource integration and acknowledges that during the service failure actors can revisit resource integration to recover a service. The key merit of this study is acknowledgment of the non-linearity or cyclical nature of value creation. However, beyond this, the model does very little to expand our understanding of the ‘black box’ as there is no detail on what happens within the value creation process except for the resources integration(see Exhibit 6 in Appendix 1).

2.7. Theory gaps

2.7.1. Absence of a more inclusive definition of value

A number of scholars and reputable marketing institutes consider value to be the concept of paramount importance in marketing theory and practice (Grönroos and Ravald, 2009; AMA, 2007; CIM, 2007; Holbrook, 1994). The SDL and SL literature streams are in line with this statement, and the attention given to value in conceptual and foundational papers is significant. However, in comparison with the GDL literature, SDL and SL is currently less rich in terms of value definitions. In SDL foundational premises (see Table 4) value was not defined (Vargo and Lusch, 2004a). A similar argument is applicable to Grönroos and Gummerus (2014) SL principles (see Table 5). Vargo and Lusch (2004a) and Grönroos and Gummerus (2014) explain how value is created and determined, but what value is remains undefined, at least in the foundations of the two logics. This is problematical, since value, despite not being precisely defined and articulated, is serving as a theoretic pillar in both SL and SDL. For example, value is mentioned in 3/10 FPs in SDL, while in SL in 10/10 principles. Therefore, a clear value definition is a missing link – an undefined building block of SDL and SL and thus, a term open to free interpretation, which has potentially hampered theoretical progress. This problem was however, partially mended in further SDL and SL publications through various definitions and descriptors of value, but there is still no consensus.

Based on extant SDL and SL literature, value is generally considered to be a multidimensional and multifaceted construct (Grönroos, 2011; Lindgreen et al., 2009; Lindgreen and Wynstra, 2005; Aarikka-Stenroos and Jaakkola, 2012; Pongsakornrungslip and Schroeder, 2011; Pihlström and Brush, 2008; Turel et al., 2007) with a range of value-in-use dimensions such as *instrumental, experiential, symbolic and/or monetary value* (see section 2.6.4). However, this is by no means a consistent and consensual view of the value dimensionality. The discrepant views become in particularly apparent when it comes to sacrifices dimension of value. SL's inclusion of sacrifices (see Aarikka-Stenroos and Jaakkola, 2012; Heinonen and Strandvik, 2009; Mohd-Any et al., 2014) makes SDL the only marketing logic in which cost/sacrifice elements of value are not seen as a part of the value definition. In SDL, costs seem to be avoided, potentially because they have an echo of the GDL lexicon and might be associated with monetary expenses (price) and therefore, value-in-exchange. However, the inclusion of costs seems needed, as sacrifices most likely represent an integral and natural

part of value-in-use. Value cannot be defined only through its 'get' elements; for example, in some situations the sum of the use benefits might not result in net positive value for customers due to, for example: an unfriendly user interface, the long time required learning how to use the product, or the inability of the product to be combined with other products and services. Furthermore, in some cases, as argued by Echeverri and Skålén (2011), value creation can turn into value destruction (i.e. no benefits created, or where sacrifices outweigh the created benefits). To address the problem of slipping into a GDL, it seems relevant to replace the term costs with sacrifices and take a more encompassing view of sacrifices – not just examining financial, but also cognitive, emotional, risk and opportunity sacrifices etc.

Verifying if SDL's view is fitting the real world can only be answered with extensive empirical work that will have to explore and confirm what value consists off. Also, there is a need to explore which value dimensions are relevant to different industries, consumption settings and relationship contexts (i.e. B2B, B2C, C2C etc.). Given the extensive body of conceptual publications on value, empirical verification in multiple contexts is required so that empirical evidence can be created about which value dimensions are relevant and if a sacrifice element should be included in the value-in-use definition. Finally, it is worth exploring whether value-in-use, defined as a mix of benefits and sacrifices, can be formulated as an aparadigmatic concept equally applicable to all three marketing logics. The research question based on the identified gap can be articulated as follows:

- ***SHOULD THE DEFINITION OF VALUE-IN-USE WITHIN THE CONTEXT OF SDL/SL INCLUDE SACRIFICE ELEMENTS?***

2.7.2. The value creation process is underspecified

In both SDL and SL value is argued to be **created in use through the application of resources** (Grönroos and Gummerus, 2014; Grönroos and Voima, 2013; Vargo and Lusch, 2012). Resources are defined as the tangible and intangible carriers of capabilities available for value creation (Madhavaram and Hunt, 2008; Fischer et al., 2010) and literature has

proposed a number of resource classifications. The **fundamental/default classification** distinguishes between **operant** and **operand** resources (Vargo, 2008; Vargo and Lusch, 2004a; Vargo et al., 2008) according to whether a resource has the propensity to transform other resources. Resources are also distinguished according to the ownership as **customer's** and **supplier's resources** (Hilton and Hughes, 2013; Aarikka-Stenroos and Jaakkola, 2012; Moeller, 2008; Arnould et al., 2006) or according to their source as **private** (resources owned), **market-facing** (resources intended for exchange) and **public** (resources not owned by anyone but accessed freely) (Vargo and Lusch, 2011). Resources are the basis for interaction between individual value creation actors (customers, suppliers) and are objects of change and activation (Håkansson et al., 2009). Thus, resources are transformed and integrated by different actors (customers, suppliers) in the process of value (co-)creation. Despite a range of classifications and labelling work present in the SDL and SL literature what is currently missing is how all of these resources and actors interplay and interrelate in the value creation process. Many questions still need answers, such as: What is the mechanism of resource transformation? What is the principle of resource integration? and What is the relative importance of each of the identified resources in the value creation and value assessment? Furthermore, given that a significant proportion of SDL papers are supplier-centred or supplier-customer dyad-centred, what remains underexplored is how the process of value creation is managed and understood from the customer's perspective. Added to this, current SDL pays significant attention to market-facing sources (supplier-sourced resources), while leaving customer- and public-sourced resources underexplored. All this adds to the argument for conducting research, as proposed here, that looks close at the value creation from the perspective of the customer, acknowledging different sources of resources and different contexts related to the usage of particular products or services. Therefore, the following research question can be articulated here:

- ***HOW IS THE VALUE CREATION PROCESS AFFECTED BY DIFFERENT ACTORS AND DIFFERENT RESOURCES?***

Value creation is seen differently within each of the three logics. GDL considers value to be produced by suppliers and delivered to customers. SDL considers value to be always co-created between suppliers and customers, while SL sees co-creation as a special case of value creation in which both suppliers and customers are physically present and sees value creation as a process where value is independently created by customers. Despite these divergent views, the important question that remains unanswered (despite several

attempts), in current SDL and SL literature, is what exactly is the value creation process (what is the structure/mechanism/anatomy of value creation). This issue requires urgent exploration especially from the customers perspective (Saarijärvi et al., 2013; Grönroos and Voima, 2013; Sandström et al., 2008). Current SDL literature still emphasises the role of the suppliers and their processes in value co-creation. However, lately the importance of the customer sphere has been better recognised especially in SL (Grönroos and Voima, 2013; Epp and Price, 2011; Grönroos, 2008; Heinonen et al., 2010; Voima et al., 2010). What needs to be addressed is how value emerges for customers and how, through a sense-making process, customers construct their view of the value of a service through their experiences (Heinonen et al., 2010).

Value creation is the process of extracting value from the usage of resources (Grönroos and Gummerus, 2014) in which the customer's well-being is increased, so that customer becomes better off in some respect (Grönroos 2008; Nordin and Kowalkowski 2011; Vargo et al., 2008). As outlined earlier value creation is an iterative, goal driven process, involving resources, actors and activities such as resource integration. However, such a broad and all-inclusive conceptualisation of value creation is of very limited use for the further theory development (Gummerus, 2013; Grönroos, 2012) because of the lack of focus (broad boundaries of value creation process). Furthermore, resource integration is still confused with the value creation process (see for example Peters et al., 2014; Hilton and Hughes, 2013; Kleinaltenkamp et al., 2012). However, there are indications that resource integration is just one of many steps in the process of value creation (see for example Aarikka-Stenroos and Jaakkola, 2012; Vargo, 2008; Vargo et al., 2010; Moeller, 2008). Thus, despite this fragmented evidence, the current theoretical understanding of the value creation is still obscure (Grönroos, 2011b; Leroy et al., 2013). Empirical efforts to tap into this black box are few (see Aarikka-Stenroos and Jaakkola, 2012; Echeverri and Skålén, 2011; Tynan et al., 2009; Moeller, 2008; Xie et al., 2008; Schau et al., 2009). What remains unclear whether value creation has a processual nature, and if so, what the phases of this process are, and what the inputs and outputs of each phase are. Further questions exist with regards to whether the process is linear (as shown by Payne et al. 2008) or cyclical (as argued by Aarikka-Stenroos and Jaakkola, 2012), and above all, how the customer sees the value creation process. Therefore, a broad research question is offered as:

- ***WHAT IS THE ANATOMY[8] OF THE VALUE CREATION PROCESS IN THE SPECIFIC RESEARCH CONTEXT EXAMINED?***

It is not yet empirically proven whether customers are aware of their value creation roles and whether customers believe they have an influence on the value they create and ultimately experience. This awareness (or role perception) itself might have an impact on customers' behaviour. If customers believe they do have an influence on value creation this might imply they will be more engaged in finding the best ways for value creation. This could then contribute to a reduction in 'unrealistic expectations' of suppliers and influence overall satisfaction with a product or service. On the other hand, if customers believe they do not (co-)create value i.e. they do not influence, the value they experience, it may be more likely that they will demand more efforts from their suppliers, and express greater dissatisfaction and exhibit more complaints. From this gap, two research questions are drawn:

- ***ARE ALL CUSTOMERS AWARE OF THEIR ROLE IN VALUE CREATION?***
- ***WHAT IMPACT DOES THIS AWARENESS HAVE ON THE VALUE EXPERIENCED IN USE?***

Lusch et al. (2007: 8) argue that "understanding how the customer uniquely integrates and experiences service-related resources (both private and public) [can be] a source of competitive advantage through innovation". Therefore if we refer to Peter Drucker's famous quote that every enterprise has two basic business processes – marketing and innovation – then understanding the principles and dynamics of customer value creation is of immense importance for excelling in these two business processes. Co-production is reasonably well explored, particularly as a means to innovate (Lusch et al., 2007). The aim of this doctoral research is, however, to improve understanding of value creation from a customer's viewpoint, as this could have important implications for marketing.

The following section elaborates the potential contribution of this doctoral research.

[8]The word *anatomy* is used to denote a structure that consists of different parts connected as a functional entity where these parts have different roles but are interconnected

2.7.3. Potential contribution

According to Hunt (2010b, 2011) there are many ways in which specific kinds of research can contribute to theory. These include: (1) developing new concepts; (2) proposing new relationships among concepts; (3) integrating specific theories into more general structures; (4) proposing that existing theories explain or predict new phenomena; (5) examining the boundaries and contexts of theories; (6) checking the logic of theories; (7) investigating the philosophical foundations of theory; and, of course, (8) empirically testing theory. According to Hunt (2011), the validity, the truth content, of theories is evaluated, most prominently, by checking their internal logic and empirical testing. In general terms, this study aims to do both.

The main contribution this doctoral research aims to make is to bridge the theoretical gaps apparent in current scholarly debates in the area of value to support the development of a stronger theoretical framework for the concept of value and value creation. This research will carefully investigate the value-in-use and value creation phenomena, but from the customer viewpoint and in the customers' natural settings and contexts (consumption). This focus on the customer should not be surprising, given that the customer is argued to hold a central position and the phenomena of interest are ultimately governed and determined by the customer (Vargo and Lusch, 2008a).

Firstly, a specific contribution is to develop a more encompassing and robust definition of value, which may include some of the value elements identified in GDL definitions of value-in-use. For example, the 'give' elements (costs/sacrifices) of value are largely unexplored in the current SDL literature, with definitions explaining value as customer (co-)created benefits without acknowledging the idea of net benefits. Secondly, the research also develops a clearer specification of the value creation process (or anatomy) by acknowledging the importance of value creation variables: actors, resources, contexts and value creation behaviours/practices. The interrelationships and interactions between these variables are presumed to have effects on created value; however, research has yet to examine all these factors together. Finally, the research examines customers' awareness of their value creation roles, their understanding of their influence and the way in which this awareness might

affect value creation. The combination of these contributions will ensure a better understanding of two key concepts: value and value creation.

As regards practice, the findings should offer new ideas on how to investigate and explore customer-defined value and value creation. It should also provide a better understanding of the nature of value. Further, the work itself will be an empirical exercise of exploring what value is in a context of a concrete product/service category, so the practitioners can get an idea of how to approach examining the value phenomena in the context of their customers. Furthermore, customers' awareness and perception of their role in value creation might serve as new criteria for market segmentation.

The following chapter elaborates and provides the choice of methodology used in this doctoral research.

3. Methodology

Despite a growing number of publications, SDL and SL still suffer from a lack of empirical research examining its theoretical foundations and still require a more consistent framework (Chandler and Vargo, 2011). As demonstrated in Chapter 2, a number of SDL/SL foundational concepts and phenomena remain insufficiently explained. Therefore, the two broad areas of study under consideration are: (a) value-in-use; and (b) the value creation process. The contribution of this work is to provide empirical insights and holistic explanations of these phenomena. In support of these two broad key contributions, a number of specific research questions will be addressed in this doctoral research (see Table 7) as developed in section 2.7.

Table 7: Research questions

RQ1: SHOULD THE DEFINITION OF VALUE-IN-USE WITHIN THE CONTEXT OF SDL/SL INCLUDE SACRIFICE ELEMENTS?
RQ2: HOW IS THE VALUE CREATION PROCESS AFFECTED BY DIFFERENT ACTORS AND DIFFERENT RESOURCES?
RQ3: WHAT IS THE ANATOMY OF THE VALUE CREATION PROCESS IN THE SPECIFIC RESEARCH CONTEXT EXAMINED?
RQ4: ARE ALL CUSTOMERS AWARE OF THEIR ROLE IN VALUE CREATION?
RQ5: WHAT IMPACT DOES THIS AWARENESS HAVE ON THE VALUE EXPERIENCED IN USE?

In order to properly answer these research questions, an informed and carefully tailored decision on methodological approach has to be made. According to Jogulu and Pansiri (2011) management researchers base their choice of methodology on suggestions recommended by academic books and journal articles or on their own preferences. Alternatively, the research questions that stem from the literature might demand different research method(s) from those preferred by a researcher or certain academic community. A number of scholars (Brause, 2000; Calabrese, 2006; Finn, 2005; Phillips and Pugh, 2005) argue that research questions may determine a research approach, whereby researchers must be able to make a rational justification for choosing a particular method or methods. Hesse-Biber (2010) argues that the research questions and choice of appropriate methodologies can be guided by a range of additional factors, such as stakeholder interests, serendipity and economic factors.

In this study, where the overarching ideal is knowledge advancement, key theoretical issues in the choice of research design were acknowledged and analysed.

These were:

1. The researcher's paradigm, which inherently determines the way researcher sees the world. Without first nominating a paradigm, there is no basis for choices regarding methodology, methods or research design (Mackenzie and Knipe, 2006);
2. The strengths and weaknesses of different research traditions (methodologies);
3. The methodological preferences in the specific academic discipline (Jogulu and Pansiri, 2011) – in this case SDL/SL; and
4. The type of data that has to be collected, which will be determined by the research questions being addressed (Brause, 2000; Calabrese, 2006; Finn, 2005; Phillips and Pugh, 2005).

Knowledge of these issues sets the foundations for the choice of an appropriate methodology and research design for this doctoral research. In the next four sections, detailed analyses of all four criteria which support the choice of a methodology are given. Section 3.1 outlines the researcher's paradigm and shows where it stands in comparison with other dominant research paradigms in social science. Clarification of the paradigmatic stance of the researcher is important, as it gives a clear idea of the set of assumptions with which the researcher approaches problems.

3.1. Research paradigms

According to Bawden (2006), a paradigm represents a set of profound beliefs that each researcher holds as their worldview about the nature of reality and the nature of knowledge. A paradigm can be defined as "a loose collection of logically related assumptions, concepts, or propositions that orient thinking and research" (Bogdan and Biklen, 1998: 22). Paradigms are reflected in the approaches researchers employ in practice consciously or unconsciously. It is the choice of paradigm that sets down the intent, motivation and expectations for the research (Mackenzie and Knipe, 2006). Knowing the paradigmatic predispositions of a researcher gives the reader knowledge about researcher's lenses or particular worldviews (how and what a researcher is predetermined to see). Before moving further into

specification of the paradigm held by the present author, a concise discussion of what constitutes a social inquiry paradigm is presented.

According to Guba and Lincoln (1994), Lincoln and Guba (1985) and Denzin and Lincoln (2005) a paradigm includes the following five sets of "interlocking philosophical assumptions" (Greene and Caracelli, 1997: 6):

1. ***ONTOLOGY.*** This set of assumptions is about the nature of what exists, or what reality and truth are (Punch, 2014). There are different ontological stances, from the position that there is a single, tangible reality that can be described and understood using scientific methods (positivistic ontology) to the stance that reality is multiple and subject to the interpretation of an individual (constructivist ontology) (Denzin and Lincoln, 2005);
2. ***EPISTEMOLOGY.*** This set of assumptions concerns the relationship of the knower to the known, the nature of knowledge and its justification (Basford and Slevin, 2003). Epistemologies range from the point that knower and the known are independent (objectivism) to the point that knower and known are interactive and inseparable (subjectivism). Epistemological assumptions clarify what is acceptable knowledge in a discipline. A particularly central issue in this context is the question of whether the social world can and should be studied according to the same principles, procedures and ethos of the natural sciences (Bryman, 2008);
3. ***AXIOLOGY.*** This set of assumptions describes the degree of influence of a researcher's values on the outcome of social inquiry (Bahm, 1993). Axiological assumptions explain to what extent researchers give a personal seal to the whole research process and interpret findings based on their own values. These assumptions can range from the belief that inquiry can be value-free (positivistic axiology) to the belief that every research is biased by the values held by researcher (constructivist axiology);
4. ***THE POSSIBILITY OF GENERALISATION.*** Generalisation or generalizability "while typically discussed in connection with inferences about populations can also involve the ability to generalise effects to treatments, measures, study designs, and procedures other than those used in a given study" (Krathwohl, 1993: 735). This set of assumptions explains whether knowledge generated can be generalised or is contingent on a specific social context. These assumptions range from the position that time- and context-free generalisations are possible (nomothetic position typical

for positivism) to the opposite belief that all knowledge is highly contextual (idiographic position typical for constructivism); and

5. ***POSSIBILITY OF CAUSAL LINKING.*** This set of assumptions explains whether it is possible to distinguish causes from effects (Denzin and Lincoln, 2005; Hesse-Biber, 2010). Positivistic and post-positivistic views accept that there are real causes that temporally precede or are simultaneous in their effects (Teddlie and Tashakkori, 2009). In this case it is possible to predict the outcomes of certain social events if a range of causes are known. On the other hand, constructivists believe that all entities are in the state of mutual, simultaneous shaping, which implies that distinguishing causes from effects is impossible (Teddlie and Tashakkori, 2009).

The social science paradigms offer a variety of views and each of the existing paradigms has uniquely defined sets of assumptions. Bateson (1972: 314) argues that the researcher is "bound within a net of epistemological and ontological premises which regardless of ultimate truth or falsity becomes partially self-validating". If we think about the paradigms and corresponding assumptions in the form of a continuum, as suggested by Teddlie and Tashakkori (2009), having constructivism and positivism as extreme paradigmatic oppositions, then it is easier to position more moderate paradigms in the terms of flexibility in research approach. This 'paradigm continuum' helps researchers to compare and contrast the paradigms and show how distant or close two paradigmatic perspectives are according to their underlying assumptions.

As already said, methodologies inherit philosophical assumptions held by the researcher. Therefore it is useful to have an inventory of dominant social sciences research philosophies in one place. For this purpose Table 8 gives a summary of the key features of four dominant social research paradigms. The Sections 3.1.1–3.1.4 will briefly discuss the most prominent features of each of the common paradigms in social inquiry, with an emphasis on post-positivism as the researcher's paradigmatic position. This is done to inform readers about the researcher's worldview and set the assumptions the researcher held in exploring the research questions.

Table 8: Dominant research paradigms in social sciences

PARADIGMS	POSITIVISM	POST-POSITIVISM	PRAGMATISM	CONSTRUCTIVISM
ONTOLOGY	Reality is single, tangible, and fragmentable. Objective reality can be described and understood by employing scientific methods.	Critical realism (external reality that is understood imperfectly and probabilistically).	Diverse viewpoints regarding social realities; best explanations within personal value systems.	Reality is multiple, constructed and holistic.
EPISTEMOLOGY	Knower and known are independent: dualism. Objective point of view.	Modified dualism.	Both objective and subjective points of view employed, depending on stage of research cycle.	Knower and known are interactive, inseparable. Subjective point of view; reality is co-constructed.
AXIOLOGY	Inquiry is value free.	Values in inquiry, but their influence may be controlled.	Values important in interpreting results.	Inquiry is value bound.
THE POSSIBILITY OF GENERALISATION	Time- and context-free generalisations (nomothetic statements) are possible.	Modified nomothetic position; external validity important.	Both idiographic and nomothetic positions are possible; both external validity and transferability issues important.	Only time- and context-bound working hypotheses (idiographic statements) are possible.
THE POSSIBILITY OF CAUSAL LINKAGES	There are real causes, temporally precedent to or simultaneous with their effect.	Causes identifiable in a probabilistic sense that changes over time; internal validity important.	Causal relations, but they are transitory and hard to identify; both internal validity and credibility important.	All entities are in a state of mutual, simultaneous shaping. It is impossible to distinguish causes from effects; credibility of descriptions important.

Source: Gephart (2004), Denzin and Lincoln (2005), Cherryholmes (1992), Guba and Lincoln (1994, 2005), Howe (1988), Lincoln and Guba (1985, 2000), Mertens (2010), Miles and Huberman (1994), Tashakkori and Teddlie (1998), and Teddlie and Tashakkori (2003, 2009).

3.1.1. Positivism

The epistemological position of positivism advocates the application of methods of the natural sciences to the study of social reality (Bryman, 2008) since “the social world can be studied in the same way as the natural world” (Mertens, 2005: 8). It is assumed that science identifies and quantitatively measures facts about a single and apprehensible reality (Guba and Lincoln, 1994; Tsoukas, 1989; Maxwell and Delaney, 2004; Schrag, 1992) that is ‘out there’ to be discovered objectively (Neuman, 2000). The data and its analysis are assumed to be objective and value-free. Data and objects of observation do not change because they are being observed (Healy and Perry, 2000). That is, researchers view the world through a “one-way mirror” (Guba and Lincoln, 1994: 110). In this paradigm, only phenomena and hence knowledge confirmed by the senses can genuinely be warranted as knowledge (Bryman, 2008). Knowledge is arrived at through the gathering of facts, which provide the basis for time- and context-free generalisations or social world laws. Positivsim "reflects a deterministic philosophy in which causes probably determine effects or outcomes" (Creswell, 2003: 7). Positivists aim to test a theory or describe an experience "through observation and measurement in order to predict and control forces that surround us" (O'Leary, 2004: 5). Time- and context-free generalisations are considered possible and real causes of social phenomena that can be determined in a scholarly sound manner (Nagel, 1986). Positivists contend that distance between the researcher and researched subject(s) should be maintained so that the research process is objective. Researchers should eliminate their biases, remain emotionally detached and uninvolved with the objects of study, and test or empirically justify their stated hypotheses (Johnson and Onwuegbuzie, 2004). Despite the ideal of objectivity, positivism has been criticised for being an inappropriate research paradigm when approaching a social science phenomenon like marketing which involves humans and their real-life experiences, for treating respondents as independent, non-reflective objects and ignoring “their ability to reflect on problem situations, and act on these in an interdependent way” (Robson, 1993: 60). This implies that, according to the opponents of the positivistic paradigm, the social and natural worlds can be seen as inherently and qualitatively different; thus, they ask for different research approaches. Furthermore, in social science, especially in qualitative research, and research where direct interaction with informants is required, a researcher is also an instrument of research (this is why positivism partners and even insists on quantitative methods – which do not fit all research situations). This means that one of the fundamental assumptions of positivism (objective measuring) is

violated – because the subjectivity of the researcher is always involved. Therefore, this paradigmatic position is very hard to defend.

3.1.2. Post-positivism

This paradigm has a more flexible approach to social research than positivism. It builds on the benefits of positivism (such as a scientific, rigorous approach to research), but acknowledges domains in which a scientific approach to studying the social world is not as applicable as it is in studying nature. The post-positivism ontology called *critical realism* holds that there is an external reality or the 'real' world to be imperfectly and probabilistically discovered (Teddlie and Tashakkori, 2003; Godfrey and Hill, 1995; Guba and Lincoln, 1994; Merriam, 1988). Knowledge and observation of the social world are fallible and theory-laden, while the world exists independently of our knowledge of it (Sayer, 1992). The ontology of critical realism assumes that the social world is not a laboratory where events happen with a mechanical logic, but rather comprises open systems with fuzzy boundaries in which social actors do not act mechanically but have active and reflective roles (Pawson and Tilley, 1997; Magee, 1985). Society is made up of feeling, thinking, human beings, and their interpretations of the world must be studied (Danemark et al., 2002). Given that social systems are in permanent flow, any social phenomenon is unlikely to be completely revealed and fully understood. However, the task of critical realists is not only to measure social phenomena, but also to describe their meaning. As Sayer (2000: 17) states, "critical realism acknowledges that social phenomena are intrinsically meaningful, and hence that meaning is not only externally descriptive of them but constitutive of them (though of course there are usually material constituents too). Meaning has to be understood, it cannot be measured or counted, and hence there is always an interpretative or hermeneutic element in social science". Therefore, critical realism rejects methodological individualism and universal claims to truth (Denzin and Lincoln, 2005).

Post-positivism generally nurtures an emancipatory axiology (Easton, 2010). This means that researchers cannot isolate the influence of their values on their research and interpretation of findings, but their influence may nonetheless be controlled. The causes of phenomena are identifiable in a probabilistic sense, and the relationship between cause and effect changes over time. "Social phenomena by their nature are fragile, so that causal impacts are not fixed but are contingent upon their environment" (Healy and Perry, 2000: 123).

In contrast to positivist research (that seeks a singular answer), the goal of research based on post-positivism is to develop a "family of answers that cover several contingent contexts and different reflective participants, albeit imperfectly" (Pawson and Tilley, 1997: 152). Research based on the post-positivism paradigm "must be primarily theory-building, rather than the testing of the applicability of a theory to a population, which is the primary concern of positivism" (Healy and Perry, 2000: 123). However, this does not imply that theory testing should not be done. Rather, the theory has to be built, and confirmed or rejected, before its generalizability is tested (Healy and Perry, 2000).

Post-positivism, in contrast to positivism, is flexible over the use of research methods and allows researchers to use both qualitative and quantitative methods. Also, the good side of post-positivism is that it postulates that laws about how social world operates can be discovered, albeit imperfectly. Finally, a post-positivist researcher is aware of all the limitations of scientific approach in studying social phenomena but reports them and discusses them openly.

3.1.3. Pragmatism

Pragmatism places the research problem as central and applies all approaches to understanding the problem. Data collection and analysis methods are chosen as those most likely to provide answers to the question, with no philosophical loyalty to any particular paradigm (Creswell, 2003). What the reality is like is up to the researcher, whose explanation will stem from a personal value system (Teddlie and Tashakkori, 2009). Interestingly, the researcher can have many coexisting value systems (unlike in other research paradigms), allowing (switching between) pluralistic ontological perspectives. Pragmatists are more oriented toward the conduct of empirical work and research solutions that work in practice (Diggins, 1994). Pragmatism is not committed to any one system of philosophy or reality. "Pragmatist researchers focus on the 'what' and 'how' of the research problem" (Creswell, 2003: 11). It is argued that this philosophy follows the middle way and does not (or should not) have any biases toward any particular research method or research design (Teddlie and Tashakkori, 2003). The knowledge creation process is based on the inquirer's norms, values and interests. Pragmatists are, therefore, not limited in the methods they can employ, which can be particularly beneficial in exploring new and complex phenomena (Salehi and

Golafshani, 2010). Also, pragmatists think that the influence of the values of a researcher is inevitable, at least in the process of results clarification, because researchers cannot transcend their human nature and reject their human lenses. Pragmatists believe that everything is in constant flux but that causal relations between phenomena can still be found through a snapshot of a moment (the falibilism thesis) (Johnson and Onwuegbuzie 2004). In the case of generalisations of knowledge, pragmatists acknowledge the subjective reality of individuals (idiographic statements) as well as the objective reality of classes or populations (nomothetic statements) (Teddlie and Tashakkori, 2009). Pragmatism, as an approach without a clear ontological and epistemological stance, enables researchers to pursue an 'everything goes' approach, which can cause problems in the quality of research and analysis. Pragmatism therefore does not provide a firm set of assumptions, but rather leaves everything to the interpretation and convenience of researcher. This implies that in a multi-method study researchers can switch their paradigmatic position at their own convenience. However, it is of utmost importance that the researcher remains consistently in one paradigm, at least over the course of a particular study, to enable consistency in delivering, assessing and clarifying findings. Furthermore, pragmatism potentially hinder theoretical debate, as it is questionable whether one can engage in a meaningful theoretical debate with a researcher who is unsure about their paradigmatic position or who switches between two paradigmatic extremes (such as constructivism and positivism).

3.1.4. Constructivism

Constructivism, as the paradigmatic opposite to positivism, is the final paradigm to discuss. Constructivism postulates that realities are multiple (relativist ontology) and socially constructed (subjectivist epistemology), while positivism postulates that reality is singular and can be objectively determined (Denzin and Lincoln, 2005).

"Constructivism inquires about the ideologies and values that lie behind a finding, so that reality actually consists of 'multiple realities' that people have in their minds" (Healy and Perry, 2000: 120). Constructivist approaches to research have the intention of understanding "the world of human experience" (Cohen and Manion, 1994: 36), suggesting that "reality is socially constructed" (Mertens, 2005: 12). The constructivist researcher tends to rely upon the "participants' views of the situation being studied" (Creswell, 2003: 8) and recognises the impact of their own background and experiences on the research.

According to Guba (1990), researchers using qualitative methods and holding a constructivist paradigm contend that: social context(s) consist of multiple constructed and subjective realities; time- and/or context-free generalisations are neither desirable nor possible; research is value-bound; causes and effects cannot be clearly distinguished; explanations can be inductively generated based on the available data etc. Constructivists do not generally begin with a theory (as positivists do); rather, they "generate or inductively develop a theory or pattern of meanings" (Creswell, 2003: 9) throughout the research process.

By default, constructivist researchers use qualitative research methods, which enable them to obtain understandings, descriptions and explanations of the social world. Their idea is not to generalise and, therefore, there is no need for quantitative methods.

3.1.5. Paradigmatic position of the present researcher

The researcher has entered the research process aware of and informed by the existing theories in the field of SL. A thorough literature review was conducted which allowed theoretical gaps to emerge (Chapter 2). Clear and unambiguous research questions were developed and the research was approached with a structure and clear focus. Adding to this, the researcher has entered the research process being fully aware of his own paradigm (but also of aware the other coexisting major paradigms and their features). The worldview of the researcher is post-positivism (sometimes known as critical realism). Acceptance of any paradigm, including post-positivism, depends on whether a researcher agrees with its basic assumptions and considers them to be true. In this study, researcher considers **post-positivism** to be the appropriate paradigm since in terms of this study, it is believed that the post-positivist paradigm is more appropriate than other research paradigms because it does not exclude any particular research methods and can operate using both qualitative and quantitative methods (Clark, 1988). To a great extent, post-positivism attempts to replicate the natural science research approach (in terms of precision, structure and rigour), but also remains flexible and adjusts for the propensities of the social world. Simply said, post-positivism allows for methodological flexibility, while at the same time (unlike with pragmatism) the researcher has a clear paradigmatic position that provides consistency to the study in terms of underlying assumptions.

The following section explains the dominant research methodologies as they partner with research paradigms. The three dominant research methodologies applied in social sciences are discussed and analysed and their strengths and weaknesses outlined. These are qualitative, quantitative and mixed methods. The understanding gained from this was important for the selection of an appropriate research methodology for this PhD study.

3.2. Research methodologies in the social sciences

According to Teddlie and Tashakkori (2009: 21) "a research methodology is a broad approach to scientific inquiry specifying how research questions should be asked and answered. This includes worldview/paradigm considerations, general preferences for design, sampling logic, data collection and analytical strategies, guidelines for making inferences, and the criteria for assessing and improving quality." Simply put "a research methodology is a way to systematically solve the research problem" (Kothari, 2008: 8). Greene (2006) defines methodology as a system of inquiry consisting of:

- ***UNDERLYING RESEARCH PHILOSOPHY/PARADIGM*** (see Section 3.1);
- ***INQUIRY LOGICS***, which includes inquiry questions and purposes, broad inquiry designs and strategies, sampling logic, criteria of quality (Teddlie and Tashakkori, 2009); and
- ***RESEARCH METHODS***, such as data collection tools**.**

Paradigmatic assumptions are always translated from philosophy to the methodology applied in empirical work (Mertens, 2010). Regardless of their paradigmatic orientation, all researchers in the social sciences have the same agenda – to provide warranted assertions or conclusions about human beings (or specific groups of human beings), societies and social processes (Biesta and Burbules, 2003). However, some social science researchers treat epistemology and methods as synonyms (Bryman, 1984; Howe, 1992). This is far from ideal because epistemology does not necessarily dictate the methods researchers should use. Epistemology is a stance on what is regarded as acceptable knowledge (Bryman, 2008). Differences in epistemological beliefs should not prevent a qualitative researcher using quantitative research methods and vice versa (Johnson and Onwuegbuzie, 2004). Although methodologies tend to be associated with particular paradigms, some believe that "the

objectives, scope, and nature of inquiry are consistent across methods and across paradigms" (Dzurec and Abraham, 1993: 75). This means that certain traditional methodology-philosophy linkages are not written in stone (Howe, 1988, 1992) and researchers can use any method that best serves their research aims. This suggests that different methods are arguably more or less compatible with different paradigms, rather than simply either compatible or not compatible.

Methodology provides the theoretical perspective that links a research problem with a particular method (or methods) and behaves like a 'platform' that supports the inquiry process (Hesse-Biber, 2010). Methodologies *per se* are founded on paradigmatic/philosophical foundations and these are translated and inbuilt in the practices of social inquiry (Denzin and Lincoln, 2005). Three broad dominant research traditions/methodologies in the social sciences are: quantitative methodology, qualitative methodology and mixed methods research (the features of which are summarised in Table 9). The terms qualitative and quantitative refer to the type of data collected and the methods used to analyse the data (McMillan and Schumacher, 2006). O'Leary (2004: 99) argues for another way of thinking about these terms, by defining qualitative and quantitative as "adjectives for types of data and their corresponding modes of analysis, i.e. qualitative data – data represented through words, pictures, or icons analysed using thematic exploration; and quantitative data – data that is represented through numbers and analysed using statistics". Regardless of the dominant and preferred form (if such exists within a methodology) of data collection and data analysis, research practice is rich with examples where quantitative methodologies use qualitative data and employ qualitative methods and vice versa (Mackenzie and Knipe, 2006; Mertens, 2005).

The following analysis guided the choice of methodology for answering the research questions addressed in this study, within a post-positivist paradigm.

Table 9: Features of dominant research methodologies in social sciences

Feature/ tradition	Qualitative methodologies	Mixed methods	Quantitative methodologies
Preferred methods	Qualitative methods	Quantitative and qualitative methods	Quantitative methods
Preferred data collection tools	• Interviews • Observations • Document reviews • Visual data analysis	Can include data collection methods used by both quantitative and qualitative methodologies	• Experiments • Quasi-experiments • Tests • Surveys
Traditional partnering paradigms	Constructivism; Intepretivism	Pragmatism, but can partner with paradigms typical for quantitative and qualitative methodologies	Post-positivism, Positivism
Form of data	Typically narrative	Narrative plus numeric	Typically numeric
Purpose of research	Most often exploratory	Confirmatory plus exploratory	Most often confirmatory
Role of theory logic	Grounded theory; Inductive logic	Both inductive and deductive logic; Inductive-deductive research cycle	Rooted in conceptual framework or theory; hypothetico-deductive model
Sampling	Mostly purposive	Probability, purposive and mixed	Mostly probability
Data analysis	Thematic strategies: categorical and contextualising	Integration of thematic and statistical: data conversion	Statistical analyses: descriptive and inferential
Validity/ trustworthiness issues	Trustworthiness; Credibility; Transferability	Quality and transferability of inferences	Internal and external validity

Source: Teddlie and Tashakkori (2009), Mackenzie and Knipe (2006), Denzin and Lincoln (2005)

3.2.1. Quantitative methodologies

Quantitative methodologies are generally partnered with the philosophies of positivism and post-positivism. Quantitative researchers gather, analyse and evaluate numerical values (numbers) in order to draw general conclusions about certain social phenomena using deductive logic (Neuman, 2000; Rocco et al., 2003; Williams and May, 1996; Salehi and Golafshani, 2010). As regards data collection, quantitative researchers have general preferences for surveys and experiments (Mackenzie and Knipe, 2006). Quantitative research, grounded in mathematical and statistical knowledge, emphasises measurement and uses the hypothetical-deductive model, which uncovers important relationships among variables and tests general propositions (Guba and Lincoln, 2005). The advantages of quantitative research include explicit values of the findings and results that are easy to clarify by following well-established mathematical rules. The strengths and weaknesses of quantitative methodologies are set out in Table 10.

Quantitative methodologies are useful when it comes to testing pre-given theory statements and conceptual frameworks against empirical data. These are known as hypotheses. Generally, quantitative approaches demand large and representative samples, which contribute to the reliability of findings. Results can be generalised if they have been replicated on different populations (Malhotra, 2010). Some quantitative methodologies enable cause-and-effects testing (Williams, 2007). Therefore, this type methodology is suitable when it comes to exploration or confirmation of the underlying structure and 'working mechanisms' of social phenomena (Elliott, 1995). Quantitative methodologies operate on more structured and standardised procedures than qualitative methodologies, and this is mainly because quantitative methods operate on mathematical and statistical principles, and the research design itself tends to operate in the domain of the known and the predefined. Results and researcher are generally independent, and if different researchers obtain the same findings applying the same approach in the analysis and data collection then the results are argued to be generalizable. This is not expected to be the case with qualitative research, where each researcher will get different findings, because of the impact of personal values on the data analysis and interpretation (Mauthner and Doucet, 2003). Quantitative method findings are generally straightforward and numerical. However, they lack the in-depth descriptions typical of qualitative research (Elliot et al., 1999).

Table 10: Strengths and weaknesses of quantitative methodologies

STRENGTHS
• Can generalise findings where results have been replicated on different populations and subpopulations and/or when data are based on random samples of sufficient size • Hypotheses constructed before data are collected • Testing and validating theories about how and why phenomena occur • Allows predictions to be made • Finding the confounding influence of variables, allowing researchers to more credibly assess *cause-and-effect* relationships • Fast data collection • Operate with precise, straightforward numerical data • Data analysis is less time-consuming (using statistical software) • The research results are relatively independent of the researcher (e.g., confidence interval, effect size, statistical significance) • It is useful for studying large populations
WEAKNESSES
• The researcher's categories and/or theories may not reflect local constituencies' understandings • Confirmation bias **–** the researcher may not identify phenomena because of the focus on theory or hypothesis testing rather than on theory or hypothesis generation • The knowledge produced may be too abstract and general for direct application to specific local situations, contexts and individuals. • Unlikely to capture an individual's views and experiences in social settings

Adopted from: Johnson and Onwuegbuzie (2004) and Parkhe (1993)

One of the main shortcomings of quantitative research designs is that the researcher may fail to identify phenomena because of the focus on theory or hypothesis testing rather than on theory or hypothesis generation (confirmation bias) (Johnson and Onwuegbuzie, 2004). However, this can be alleviated when findings from earlier qualitative research inform the design of the quantitative research (Greene et al., 1989; Flemming et al., 2008). Nevertheless, quantitative methods are less likely to capture personal views and experiences in social settings (Parkhe, 1993) and usually provide 'shallow' or detail-poor findings (Denzin and Lincoln, 2000). This drawback is likely to be very important when exploring consumption and idiosyncratic phenomena, and in this area qualitative methods offer clear advantages. However, the quantitative methods, especially the more recent structural equation modelling (SEM) family of quantitative techniques, give researchers tools that allow for explanation of the mechanisms of complex social phenomena. SEM enables researchers to put together complex networks of cause-and-effect relationships and thus test the mechanisms underlying particular phenomenon (Kline, 2011). The models presented and explained this way provide a relatively rich foundation for discussion and reporting.

Therefore the argument that quantitative methods are not capable of studying complex phenomena is not valid.

3.2.2. Qualitative methodologies

Qualitative methodology generally partners with the philosophy of constructivism. Qualitative researchers analyse and draw conclusions from narratives and text, communication and observation of informants, in order to explain, for example, different behavioural phenomena, perceptions and understandings of different social issues (Jogulu and Pansiri, 2011; Salehi and Golafshani, 2010). Qualitative research is particularly useful when it comes to the exploration of and describing of complex phenomena and personal experiences (Polit and Beck, 2006). Qualitative research is highly descriptive and often explores meanings, who said what to whom, as well as how, when, and why (Gephart, 2004). The approach is sensitive and can capture the image of the world as seen through the eyes of informants. Data generated through qualitative inquiry are generally rich and descriptive texts, but the analysis of such data is less structured and requires more time and effort compared with quantitative analysis. This is why the reports produced by qualitative researchers are generally comprehensive, written in the first-person and in an informal style.

Qualitative inquiry usually requires the researcher to become immersed in the fieldwork and to establish relationships or contacts with informants. However, this can sometimes be a source of bias, as the researcher may exert some influence on informants (Gephart, 2004). Good qualitative research designs are able to discover important variables of social phenomena that could not have been predicted by the researcher (Denzin and Lincoln, 2005). The preferred methods include ethnography/observations, interviews and case studies (Bryman, 2008). Qualitative researchers generally build their studies on small samples (Van Maanen, 1998). Small samples cannot be considered as representative of the population, and while qualitative findings offer rich insights, they may also suffer from bias caused by the researcher, who at the end gives subjective meanings and conclusions (Miles and Huberman, 1994). However, the agenda of qualitative researchers is generally not to generalise their findings but rather to provide problem understanding and description (Husen, 1997). Qualitative analysis is far less well specified than is the step-by-step quantitative analysis. This is one of the reasons why peer reviewers of qualitative research struggle to determine the validity and reliability of certain qualitative research reports.

Qualitative research lacks attention to the quantitative aspects of a phenomenon and thus is not suitable for studying causes and effects, or quantifying any phenomena under focus (Bazargan, 2007). A list of the strengths and weaknesses of qualitative methodologies is given in Table 11.

Table 11: Strengths and weaknesses of qualitative methodologies

STRENGTHS
• Data are based on the participants' own categories and meanings • Useful for studying a limited number of cases in depth • Useful for generating understandings of complex phenomena (Yin, 1994; Gummesson, 2002) • Provides individual case information • Provides an understanding of people's personal experiences (Polit and Beck, 2006) • The researcher identifies contextual and setting factors as they relate to the phenomenon of interest • The researcher can use the primarily qualitative method of "grounded theory" to generate inductively a tentative but explanatory theory about a phenomenon • Can determine how participants interpret 'constructs' (e.g. self-esteem, IQ, value) • Data collected in naturalistic settings • Responsive to local situations, conditions, and stakeholders' needs • Responsive to changes that occur during the conduct of a study (especially during extended fieldwork) and may shift the focus of a study as a result • Data are in the words and categories of participants • One can use an important case to demonstrate vividly a phenomenon to the readers of a report • Determine idiographic causation (i.e. determination of causes of a particular event)
WEAKNESSES
• It is more difficult to test hypotheses and theories • It may have less credibility than quantitative methodology with some administrators and commissioners of programmes • It generally takes more time to collect the data than in quantitative research • Data analysis is often time consuming • The results are more easily influenced by the researcher's personal biases and idiosyncrasies • Lack of attention to quantitative aspects of a phenomenon (Bazargan, 2007) • Limited possibility to generalise findings (Denzin and Lincoln, 2005; Husen, 1997) • Qualitative researchers sometimes do not pay due attention to providing an adequate rationale for interpretations of their data (Constas, 1992)

Source: Johnson and Onwuegbuzie (2004) extended with contributions from other authors.

The qualitative methods are generally very powerful when it comes to exploring new and complex phenomena, or when people's experiences, views and in-depth explanations are sought. Qualitative researchers have an advantage over quantitative researchers (who have to follow strict sets of rules) in that they generally can adjust the research process to the contingencies of a situation or a particular set of participants.

3.2.3. The third methodological movement – mixed methods research

Mixed methods research is a separate type of methodology that is distinct from quantitative and qualitative methodologies, while at the same time being their natural complement (Johnson and Onwuegbuzie, 2004; Tashakkori and Teddlie, 2003). It is referred to as 'the third methodology' (Jogulu and Pansiri, 2011) or 'the third methodological movement' (Cameron, 2011; Salehi and Golafshani, 2010; Azorín and Cameron, 2010). Mixed methods research includes at least one quantitative and one qualitative method of data collection in a single study (Johnson et al., 2007; Greene et al., 1989).

Ross and Onwuegbuzie (2010) described mixed methods research as a methodology that:

- Relies on combined qualitative and quantitative viewpoints, data collection, analysis, and inference techniques;
- Follows the *fundamental principle* that researchers should collect multiple data using different strategies, approaches, and methods in such a way that the resulting mixture or combination brings complementary strengths and reduced weaknesses (Brewer and Hunter, 1989); and
- Generally partners with the philosophy of pragmatism but is also compatible with other paradigms that traditionally partner with qualitative and quantitative methodologies, such as constructivism and post-positivism (Greene and Caracelli, 1997).

The central or fundamental premise of mixed methods research is that "the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone" (Creswell and Plano Clark, 2007: 5). Divergent findings created through methodological eclecticism lead to greater depth and breadth in overall results, from which researchers can make more accurate and credible

inferences (Jogulu and Pansiri, 2011; Hanson et al., 2005; Begley, 1996; Foss and Ellefsen, 2002; Risjord et al., 2002; Halcomb and Andrew, 2009). However, the idea of mixing and integrating these two research methodologies (qualitative and quantitative) has been seen as problematic by some. For example, Berrios and Lucca (2006), Guba (1987), Lincoln and Guba (1985) and Smith (1983) contend that due to the conflicting ontological, epistemological, axiological and methodological assumptions of qualitative and quantitative research, mixing the two methodologies in a single study is impossible. This phenomenon is known as the *incompatibility thesis* (Howe, 1988). However, mixed methods researchers have successfully argues against this thesis, and have shown that mixed methods researcher do not combine different paradigms (Hesse-Biber, 2010; Tashakkori and Teddlie, 2009) but only different data collection and research methods. Table 12 summarises the strengths and weaknesses of mixed methods research.

Table 12: Strengths and weaknesses of mixed methods research

STRENGTHS
• Good for studying complex phenomena (Salehi and Golafshani, 2010) • Research has a broader perspective than mono-method research (Azorín and Cameron, 2010) • Better understanding of the researcher problem than with mono-method research (Johnson and Onwuegbuzie, 2004) • Comprehensive technique (Tashakkori and Teddlie, 1998) • Greater depth and breadth in overall results • The simultaneous use of induction and deduction, which enables a full theory generation cycle in a single study (de Waal, 2001) • Provides a better basis for inference, due to the triangulation of methods (Creswell and Miller, 2000) • Inherits complementary strengths from quantitative and qualitative methods (Risjord et al., 2002) • Enhances significant findings (Onwuegbuzie and Leech, 2004).
WEAKNESSES
• Time-consuming research (Connelly et al., 1997; Anaf and Sheppard, 2007) • The combination of data collection methods may significantly increase the associated financial costs (Duffy, 1987; Redfern and Norman, 1994) • In addition to the basic skills required with qualitative and quantitative methods, the mixed methodologist requires skills specific to mixed methods research. These include understanding specific paradigmatic differences, management of large datasets, the integration and mixing of aspects of the study and reporting mixed methods projects (Bazeley, 2003; Andrew and Halcomb, 2009) • Extensive datasets (Bazeley, 2006)

According to de Waal (2001), the inquiry logic of mixed methods includes the use of both induction (or discovery of patterns) and deduction (testing of theories and hypotheses). Having an inductive-deductive cycle in a single study enables researchers to undertake theory generation and hypothesis testing without compromising one for the other (Jogulu and Pansiri, 2011). Mixed methods research should be used when the "nexus of contingencies in a situation, in relation to one's research question(s), suggests that mixed methods research is likely to provide superior research findings and outcomes" (Ross and Onwuegbuzie, 2010: 129). This is why mixed methods are becoming an increasingly popular research approach in different social sciences, including marketing and management (Azorín and Cameron, 2010; Schifferdecker, 2007; Bryman, 2008; Greene et al., 1989).

The following section will discuss the methodologies applied in service logic empirical articles, as this might provide a good insight into what methodologies and research designs are suitable for theoretical studies like the one conducted in this PhD research.

3.3. Methodologies applied in SDL and SL empirical articles

An important step in determining which methodology to apply is to evaluate what kind of methodologies have been applied for the study of the same or similar problems by the academic community and why (Jogulu and Pansiri, 2011). In the process of the literature review, 28 empirical articles in the SDL/SL literature were identified. Table 13 summarises these and outlines which topics were studied, with what kind of methodology and research design.

Firstly, it is notable that most of the empirical articles explore the topic of value co-creation, value and value measurement. Even though the majority of researchers gravitate toward these three topics, the contexts of the studies are quite heterogeneous. For example, value co-creation was examined in different 'relationship' contexts (B2B, B2C, C2C), in different industry contexts (public transport, luxury goods, leisure, finance, maintenance, toys, etc.)

and with a focus on different parties (supplier, customer, customer-supplier dyad, customer network, supplier network etc.).

Of the 28 articles, 61% were based on qualitative methodologies, 32% on quantitative methodologies and 7% on mixed methods. The rationales for such an apparent preference for qualitative methodologies can be found in the aspirations of researchers to achieve better understanding of phenomena (Gebauer et al., 2010) in the early stage of discipline development. The most logical reason for the preference for qualitative methodologies might be found in the fact that the whole subject is in a growth phase, where exploratory studies are generally preferred, as they are able to provide more detailed descriptions of phenomena. This fits with the preferred methods (interviews and case studies), as they are particularly useful when the main task is to provide rich descriptions of focal concepts and surrounding context (Denzin and Lincoln, 2005). However, if we refer to Vargo and Lusch (2008a: 7), FP 10, "value is always uniquely and phenomenologically determined by the beneficiary", one might conclude that value is the reality of an individual and any further generalisations are thus impossible. Examining this further, it is clear that this is likely to be true when it comes to the articulation of value for a particular product or service in a given consumption context. On the other hand, when it comes to value creation and value determination, generalisations and structures regarding these processes are expected to be possible. Value creation is a process that occurs together with consumption, and consumption is learned in the process of socialisation (Mangleburg et al., 1999). This implies that the consumption or usage of a particular product or service, observed among a large group of customers, is expected to have commonalities. For example, there are many online and offline customer groups that assist and teach other customers about optimal consumption or usage practices. This would imply that there are large groups of people that use products and services in a very similar (if not identical) fashion.

Many of the identified empirical studies in the SDL/SL literature employed more than one method. In exploring the complex phenomena of customers' value creation and value co-creation, authors often combine different qualitative methods in order to benefit from the complementarity and to get more detailed insight into the phenomena of interest. Combining methods in the form of multi-methods design was usually explained as an approach that allowed the investigation of multifaceted issues in the particular contexts, as well as providing understandings of the dynamics of the phenomena in question (Skarp and

Gadde, 2007). According to Jick (1979), combining research methods, or triangulation, has multiple benefits, especially in understanding complex social issues and increasing the validity of findings. It is assumed that "the effectiveness of triangulation rests on the premise that the weaknesses in each single method will be compensated by the counter-balancing strengths of another" (Jick, 1979: 604). However, very few authors have applied a mixed methods approach or, to be more precise, to integrate qualitative and quantitative methods into a single study. This is less because of the weaknesses of a mixed methods approach (see Table 12) and more because of the politics of publication: in particular, mixed methods research usually requires lengthy reports, which are generally not welcomed by journal editors (Tashakkori and Teddlie, 2003).

Table 13 provides a summary and evaluation of the methodologies applied in the 28 empirical articles identified in the SDL/SL literature. The following section examines the nature of the research questions addressed in this study.

Table 13: Methodological preferences within the SDL and SL literatures

STUDY	TOPIC	RESEARCH SITE	METHODOLOGY	RESEARCH METHODS	SAMPLING	COMMENTS
Cova and Salle (2008)	Co-creation value with customer network actors	Interviews conducted in 2 supply companies (from electronics and defence industry)	Qualitative	• Case study • Interviews with managers • Observations	Purposive sampling	Multi-method design
Payne et al. (2008)	Managing co-creation of value	Primary data collected from the managers of 18 firms from the fields of banking, leisure, telecommunications etc.	Qualitative	• Workshops/interviews	Purposive sampling	Mono-method design
Skarp and Gadde (2008)	Problem solving in the upgrading of product offerings in the steel industry	Swedish steel producers	Qualitative	• Exploratory case study • In-depth interviews • Observation • Analysis of secondary data	Snowball sampling	Multi-method exploratory design
Xie et al. (2008)	Food prosumption and customer value co-creation	Data collected in randomly selected households	Quantitative	• Survey	Random sampling	Mono-method design. Data analysed using SEM
Brodie, Whittome and Brush (2009)	Customer perception of the service brand of an airline company	Primary data collected on-line	Quantitative	• Survey	Random sampling	Mono-method design
Heinonen and Strandvik (2009)	Monitoring value in use of e-service	A travel agency website	Quantitative	• Survey	Convenience sampling	Mono-method design
Schau et al. (2009)	How brand community practices create value (LEGO)	Primary data collected through interviews and netnography (brand comm. websites)	Qualitative	• In depth interviews • Naturalistic observation • Netnography • Cross case-study analysis	Purposive sampling.	Multi-method design
Tynan et al. (2009)	Co-creating value for luxury brands (automotive, clothing and department store)	Primary data collected in the field: in the store and outside the store	Qualitative	• Case study • Interviews • Analysis of website content • Netnography • Ethnography	Purposive sampling	Multi-method design

Table 13 (continued): Methodological preferences the SDL and SL literatures

STUDY	TOPIC	RESEARCH SITE	METHODOLOGY	RESEARCH METHODS	SAMPLING	COMMENTS
Andreu, Sanchez and Mele (2010)	Value co-creation among retailers and consumers in the furniture market	Data collected in the field, in furniture shops. Both customers and retailers were interviewed.	Qualitative	• Multiple case-studies • In-depth interviews • Observations • Analysis of secondary data	Purposive sampling	Multi-method design
Gebauer, Johnson and Enquist (2010)	Value co-creation in public transport services	Primary data collected in the company (interviews with senior executives)	Qualitative	• Content analysis of written communications • Interviews • Secondary data from annual reports	Convenience sampling	Multi-method design.
Hatch and Schultz (2010)	LEGO brand co-creation with its brand community	On-line and off-line media content	Qualitative	• Secondary data analysis • Longitudinal case study	Purposive sampling.	Mono-method design
Korkman, Storbacka and Harald (2010)	Value co-creation in e-invoicing	Self-ethnography of expert group	Qualitative	• Analysis of secondary data • Self-ethnography • Interview with an expert • Case study	Purposive sampling.	Multi-method design
Aarikka-Stenroos and Jaakkola (2011)	Value co-creation in the context of knowledge-intensive business services	Data collected from both suppliers and customers in knowledge-intensive business services	Qualitative	• Interviews	Theoretical sampling	Mono-method design
Baron and Warnaby (2011a)	Individual customers' use and integration of resources	British library support forum and dialogue with executives of BL.	Qualitative	• Netnography • Interviews • Case study	Convenience sampling	Multi-method multi-staged iterative design
Echeverri and Skålén (2011)	Co-creation and co-destruction. Interactive value formation.	Both employees and customers interviewed in the premises of a transportation company.	Qualitative	• Exploratory case study • Interviews	Purposive sampling	Mono-method iterative design
Pongsakornrungslip and Shroeder (2011)	Value co-creation in a co-consuming brand community	Data were collected online at the ThisIsAnfield fan community page	Qualitative	• Netnography • Analysis of secondary data • Dialogue/interviews	Random and purposive sampling	Multi-method iterative design

Table 13 (continued): Methodological preferences within the SDL and SL literatures

STUDY	TOPIC	RESEARCH SITE	METHODOLOGY	RESEARCH METHODS	SAMPLING	COMMENTS
McColl-Kennedy et al. (2012)	Health care customer value co-creation practice styles	Data collected from two Australian oncology clinics	Qualitative	• In-depth interviews • Focus groups • Ethnography	Purposive sampling	Multi-method design
Melton and Hartline (2012)	Employee collaboration and learning orientation in new service development	Data collected online from top executives of educational, health and financial services companies	Quantitative	• Survey	Purposive sampling	Mono-method design. Data analysed using SEM
Roggeveen et al. (2012)	Co-creation and service recovery	Scenario-based experiments in the university setting	Quantitative	• Survey based experimental approach • SEM	Convenience sampling	Multi-method design
Yi and Gong (2012)	Scale development for customer value co-creation behaviour in service industries	Study conducted on undergraduate and postgraduate students	Mixed methods	• In-depth interviews	Convenience sampling	Sequential mixed methods design. Quantitative data analysed using SEM
FitzPatrick, Davey, Muller et al. (2013)	Study of value-creating assets in the hotel industry	20 largest publicly listed hotels in Europe and the US	Quantitative	• Secondary data analysis	Purposive sampling	Mono-method design
Zainuddin, Russell-Bennett, Previte (2013)	Investigating the role of multiple actors in the value creation process for a preventative health service	Study conducted on a sample of 797 Australian women with regard to a free government breast-screening service	Quantitative	• Online survey	Purposive sampling	Mono-method design. Data analysed using SEM
Leroi-Werelds, Streukens, Brady and Swinnen (2014)	Assessment of common methods used to measure customer value	Analysing the psychometric properties of the four identified measures of value based on 16 different samples with total of 3,360 observations	Quantitative	• Survey	Purposive sampling	Multi-method design

Table 13 (continued): Methodological preferences within the SDL and SL literatures

STUDY	TOPIC	RESEARCH SITE	METHODOLOGY	RESEARCH METHODS	SAMPLING	COMMENTS
Mohd-Any, Winklhofer and Ennew (2014)	Measuring users' value experience on a travel website (e-Value)	UK online travel purchasers	Quantitative	• Survey	Random sampling	Mono-method design. Data analysed using SEM
Payne and Frow (2014)	Exploring how companies develop their value propositions	Investigating two financial companies operating in B2B and B2C markets	Qualitative	• Case study	Purposive sampling	Mono-method research design
Randall, Wittmann, Nowicki and Pohlen (2014)	Studying how well service logic supports supply chain management	Survey with 52 supply chain experts (35 from government and 17 from industry)	Mixed methods	• Survey	Purposive sampling	Mixed methods design. Qualitative and quantitative data obtained in survey
Skålén, (2014)	Anatomy of value propositions and service innovation	Eight-firm study. Interviews and observation of the participants of different innovation projects and customers	Qualitative	• Interviews • Observation	Theoretical sampling	Multi-method design
Smith, Maull, and Ng (2014)	Servitization and operations management	Data collected from the employees and customers of a manufacturer of durable capital equipment	Qualitative	• In-depth interviews • Analysis of secondary data	Purposive sampling	Multi-method design

3.4. Types of data needed

One of the basic issues when choosing appropriate research methods is the type of the data required to properly address the research questions (Creswell and Plano Clark, 2011). Knowing what the data requirements of the research questions are, combined with knowledge of the features (weaknesses and strengths) of different research methodologies provides a solid foundation for choosing the best-fitting research methodology. The following five paragraphs briefly discuss the data requirements of each the research questions.

RQ1: SHOULD THE DEFINITION OF VALUE-IN-USE WITHIN THE CONTEXT OF SDL/SL INCLUDE SACRIFICE ELEMENTS?

One of the main tasks of this research was to examine the nature of value-in-use and provide a comprehensive definition of it, specifically exploring the place of the cost/sacrifice elements, which are currently absent, as well as exploring whether there are other elements that might also be missing. This question was addressed as there is literature from the pre-SDL era argues that costs and sacrifices are both integral parts of value-in-use (see for example: Zeithaml, 1988; Oliver, 1999; Slater and Narver, 2000; Walter et al., 2001 and Eggert and Ulaga, 2002). However, this is not the case with the definitions value from the SDL era. Here, value-in-use is described as context-dependent (Vargo, 2008), interactive (Holbrook, 2006), intangible (Vargo and Lusch, 2008b), idiosyncratic (Vargo, 2008), perishable (Vargo and Lusch, 2008b), intra- and inter-subjective (Edvardsson et al., 2011) and experiential (Vargo and Lusch, 2006; Vargo, 2009). Therefore, customers' explanations and understanding of value need to be related to a specific context and to the usage of a particular service or product; without context, customers may be unable to discuss value. Added to this, this question seeks to clarify customers' observations and appreciations of used or consumed services and products, and to capture experienced benefits and sacrifices. It is unlikely that a researcher is capable to *a priori* define all the variables that are considered when arbitrating value. The data needed here should entail and reflect these 'hard to predict/see' variables, the way they are understood, perceived and defined by customers – rich and highly descriptive data that contains customers' narratives, views and

experiences is needed (i.e. the rich qualitative data). Therefore, the research instrument used should be 'open' and 'sensitive' (i.e. interviews).

RQ2: HOW IS THE VALUE CREATION PROCESS AFFECTED BY DIFFERENT ACTORS AND DIFFERENT RESOURCES?

In the foundational articles of Vargo and Lusch (2006, 2008a, 2008b, 2008c), resources were given significant attention. Resources are described as inseparable parts of a customer's value creation process and 'ingredients' of that process. Customers, suppliers and networks of actors are already identified as being important within the value creation process (Vargo et al., 2008). However, Arnould et al. (2006: 95) observed that "much remains to be done to systematise our understanding of customers' operant resources. Firms must understand how consumers juggle their own and firm resources in order to compensate for specific types of operant resource deficits". Vargo and Lusch (2006) suggest that most aspects of SDL, including resource integration, need refinement and elaboration. The roles of the actors in value creation remain unclear, and so does the integration of the resources provided by them. Furthermore, there is a need to increase our understanding of whether value creation changes when different resources are included and combined. It is still not clear how customer's resources interact and 'compete' with supplier and network resources in the process of consumption. So data was needed to reflect and 'map' different resources and interaction mechanisms in different settings. Thus, it was important to explore this from the customer's viewpoint, with detailed explanations of how they recognise and understand resources, where resources come from, how resources are created or made available, and how and why resources are selected and integrated in customer practices. Also, it was important to see how customers compensate for the resources not present in their value creation process, and therefore elaborate descriptions of resource integration practices were needed. What was also needed was an understanding of how customers recognise a resource as a resource, how they matches their own resources with the resources of suppliers, how customers compensate for their and suppliers' insufficient/absence of resources, etc. Therefore, data to answer the research question should be rich in descriptions and broad in scope, meaning that qualitative data are needed.

RQ3: WHAT IS THE ANATOMY OF THE VALUE CREATION PROCESS IN THE SPECIFIC RESEARCH CONTEXT EXAMINED?

While value is argued to be uniquely determined by the customer, the value creation process (i.e. consumption) is argued to be a learned phenomenon that may have a structure/anatomy (Mangleburg et al., 1999). The SDL/SL literature, despite its acknowledgment of the customer's primary role in value creation, provides minimal empirical insight into the value creation process from the customer's point of view. Inputs (resources) and outputs (value) are identified in general terms, but the structure of the value creation process and the interrelations between its elements remain a mystery (Ngo and O'Cass, 2010). As mentioned before, authors (Grönroos, 2006, 2009; Leroy et al., 2013) pointed out that value creation still remains a 'black box'. What the value creation process in the fact is, and what it includes in terms of resources, actors and networks of actors are not fully known. Furthermore, is it possible to discover something that is applicable to every value creation process? Is there a structure or anatomy inherent to value creation processes and how are the building blocks of the value creation process interrelated? The idea in this study is to discover and confirm of the anatomy of the value creation process. This implies the need to have an inductive-deductive cycle of knowledge generation. Therefore both qualitative and quantitative data are needed. Qualitative data are needed to discover what happens in the process of consumption, as this is generally out of the reach of researchers. Therefore, customers have to provide elaborate descriptions what happens in the privacy of their consumption. It is necessary to have customers describe this process and to select a qualitative method that will be able to access this privacy in a non-invasive and customer-acceptable way (i.e. interviews). Qualitative methods are in this case particularly useful for the purpose of identifying and exploring as many variables of value creation as possible. Based on this knowledge, it is possible to create hypotheses[9] about the anatomy of the value creation model. On the other hand, quantitative methods have to be used to test both the hypotheses and the model on a large sample of respondents so that hypothesised relations between elements (and indeed the whole model) can be confirmed or rejected. Ultimately, if there is an anatomy of value creation, qualitative data are initially needed to discover and explain each of the elements of this structure. Following the description of the anatomy of value creation, quantitative data are needed to check each element's importance and significance and finally to confirm or reject the hypothesised structure. Therefore, a holistic

[9] In the form of proposals for how variables in the model are interrelated

explanation of value creation can be achieved through careful selection of a mixed methods research design.

RQ4: ARE ALL CUSTOMERS AWARE OF THEIR ROLE IN VALUE CREATION?

RQ5: WHAT IMPACT DOES THIS AWARENESS HAVE ON THE VALUE EXPERIENCED IN USE?

Given that these two research questions are interrelated, they will be examined jointly. Vargo and Lusch (2008) argue that customers are always value co-creators or value creators (Grönroos, 2009). However, there is a question as to whether customers are aware of their value creation roles? Does awareness of the value creation role change the way value creation is approached? These issues are perceptual and demand respondents' views on their roles in consumption. The focus of these two research questions is to see whether customers consider themselves to have any role in the creation of value. This knowledge might have implications for the theory and practice of marketing. Namely, if results show that one group of customers consider themselves to be value creators while another group holds that they are only recipients of value, then this perception of customers' value creation roles might have implications for how customers approach consumption, and what they expect from, and how they interact with suppliers. Furthermore, this could be a new, and potentially important, market segmentation criterion. Here, both qualitative and quantitative data are needed. Qualitative data will provide clear explanations of how customers see their roles, while quantitative data will provide (a) estimates how large the different perceptual groups are; and (b) how the mechanism of value creation works across these groups.

3.4.1. Summary

The research questions addressed in this study initially require qualitative data, and then quantitative data. The questions are framed in such a way to have an inductive-deductive cycle of research. This cycle requires: (a) discovery of variables important for understanding and defining value creation and value (following their discovery, the aforementioned variables will be connected in a model that explains the entire mechanism of value creation); and (b) confirmation of qualitative findings on a wider population using quantitative methods so that the findings can be generalised and theories confirmed.

The next section suggests appropriate methodology and research designs based on the provided arguments in Sections 3.1–3.4. The Section 3.5 will end with a map of the sequence of empirical studies performed in this doctoral research, so that readers have an idea of the structure of the empirical section of this doctoral research.

3.5. Choice of methodology and research design

The most appropriate methodology for answering the research questions addressed in this study was mixed methods research, with a sequential exploratory-confirmatory research design[10]. This choice was based on:

- The paradigmatic position of the researcher, described as post-positivism (see Section 3.1.2).
- An understanding of the strengths and weaknesses of different methodologies and research methods (explained in Sections 3.2.1–3.2.3);
- Evidence that scholars within the SDL/SL areas have tended to prefer multi-method designs and the advantages offered by triangulation of methods (see Section 3.3); and
- The nature of the phenomena explored, which are multi-layered and complex and demand the gathering of both qualitative and quantitative data (see Section 3.4).

As already stated, mixed methods as a research methodology is good for studying complex phenomena that need exploration from different perspectives (Salehi and Golafshani, 2010; Creswell and Plano Clark, 2011; Bazely, 2008). The benefits of using mixed methods are numerous. Most important is that well-designed mixed method research has the strengths of both qualitative and quantitative methods, which lead to more exhaustive and multi-layered findings. If carefully designed, mixed methods study can provide a better and multi-perspective understanding of phenomena than can a design where only one research

[10] *Exploratory* since this research design is particularly useful for "exploring relationships when study variables are not known, refining and testing an emerging theory, developing new ... test/assessment instruments based on an initial qualitative analysis, and generalizing qualitative findings to a specific population" (Hanson et al., 2005: 229). This design starts with an exploratory/qualitative research phase that then informs the subsequent confirmatory/quantitative phase

method is applied (Cameron, 2011; Jogulu and Pansiri, 2011). Mixed methods is compatible with post-positivism as a research paradigm since mixed methods as a methodology is not about mixing different paradigms but rather mixing different methods, at the technical/operational level (Greene and Caracelli, 1997). The mixed methods research tradition offers a solid platform for theory testing, theory generation and theory refinement (Creswell, 2003), which is one of the main goals of this study. Mixed methods are better able to increase the integrity and applicability of findings of new and complex research issues (Schifferdecker and Reed, 2009). They offer additional benefits such as triangulation and complementarity of findings acquired through the application of qualitative and quantitative methods (Andrew and Halcomb, 2007).

Implicitly, the marketing discipline encourages mixed methods research because of the emphasis on rigorous research (Woodruff, 2003) and, as Hunt (1994) pointed out, research using qualitative methods can usefully complement quantitative analysis and vice versa. However, the strengths of mixed methods research cannot compensate for a poor research design, and mixed methods, despite their strengths, cannot be considered a panacea for every research problem. Therefore, a careful mixed methods research design is required.

To put a methodological approach into practice, a research design has to be provided. Research design involves a clear focus on the research questions, the purposes of study (the researcher's agenda), the type of information that will most appropriately answer the research questions and strategies for the most effective collection of the required information (LeCompte and Preissle, 1993). A research design is a chart of guidelines that interconnects the theoretical paradigm firstly to strategies of inquiry and secondly to methods for collecting empirical data (Denzin and Lincoln, 2005). A research design places researchers in the empirical world and connects them to their specific sites, persons, groups, institutions, and bodies of relevant interpretive material, including documents and archives. Furthermore, research design connects the researcher to specific methods of collecting and analysing empirical materials.

As already said in this doctoral thesis, an exploratory sequential mixed methods research design was applied. This design consists of an initial qualitative phase which informs a subsequent quantitative phase. More precisely, completion of the first phase (interviews)

formed the basis for the development of a research instrument (survey) that was used in the quantitative phase. This was done in order to probe the qualitative model of value creation (developed in the qualitative research phase) on a larger sample for confirmation or rejection. In mixed methods terminology, this design is called *sequential exploratory design (*Harrison and Reilly, 2011; Tashakkori and Teddlie, 2003), *sequential* since there are two broad separate research phases in a sequence, with the initial exploratory qualitative phase followed by the confirmatory quantitative phase. The qualitative phase is based on interviews that have the purpose of obtaining rich descriptions of the phenomena of interest. Based on the findings from qualitative phase, a conceptual model of value creation is proposed. The model is described through variables and the relationships between these variables. This model then became a subject of further scrutiny and examination in the confirmatory quantitative phase, which consisted of a series of studies.

Traditionally, in the methodology chapter the researcher provides explanations of the research and the sampling methods employed. However, these important parts of the methodology will be provided alongside the results of the empirical studies, in Chapters 4, 5 and 6 given that providing them upfront would be confusing for readers. In this light, Table 14 provides concise information about the empirical body of work in this doctoral research.

The following section outlines the research context for both the qualitative and the quantitative empirical studies conducted in this doctoral research.

Table 14: Outline of the sequence of empirical studies

MIXED METHODS RESEARCH PHASE	EXPLORATORY PHASE/ QUALITATIVE RESEARCH	CONFIRMATORY PHASE/QUANTITATIVE RESEARCH						
MAIN AIM	Developing qualitative model of value creation	Developing quantitative model of value creation				Assessing quantitative models of value creation		
STUDY	1	2	3	4a	4b	4c	4d	4e
STUDY TITLE	Interviews with users of digital cameras	Expert assessment of scales and indexes	Exploratory factor analysis (EFA)	Confirmatory factor analysis (CFA)	Indicator collinearity and external validity tests for indexes	Testing the model of customer's value creation	Testing the model of value co-creation	Testing awareness of value creation and its impact on customer's value creation process
DATA COLLECTION	Semi-structured interview	Survey	Survey	Survey	Data from Study 4a	Data from Study 4a	Data from Study 4a	Data from Study 4a
SAMPLE SIZE	29 (World)	12 (UK)	500 (USA)	600 (UK)	600 (UK)	449 (UK)	151 (UK)	142 and 285 (UK)
MAIN ANALYTIC TECHNIQUE	Thematic qualitative analysis	Descriptive statistics, frequencies	Principal axis factor analysis	CB-SEM, Maximum likelihood factor analysis	Linear regression, bivariate correlation	PLS-SEM	PLS-SEM	PLS-SEM
SOFTWARE	NVivo 10	SPSS 22	SPSS 22	LISREL 8.80	SPSS 22	SmartPLS 3.1.6	SmartPLS 3.1.6	SmartPLS 3.1.6
SPECIFIC PURPOSE	Creating a qualitative model of value creation	Defining measurement models and ensuring their face and content validity	Assessment of the psychometric scale features and scale refinement	Confirming refined scales on an independent sample	Testing and refining formative constructs	Testing findings from Study I for confirmation or rejection	Testing findings from Study I for confirmation or rejection	Studying how awareness of value creation affects the value creation process
FOCAL RQS	1, 3, 4	–	–	–	–	1, 2, 3	1, 2, 3	4, 5
SECTION	4	5.1	5.2	5.3	5.4	6.4	6.5	6.6

3.6. Choice of research context for the empirical studies

The research focuses on customers' value creation experiences and value assessment with regard to a particular product or service. Thus, the customer's point of view and testimonies are the starting and ending points of the research. By selecting a particular consumption topic or particular product or service, the consumption process is contextualised and questions on value creation and value can be translated from the theoretical and abstract into the practical and (for participants) understandable.

Given the need to examine customers' defined concepts of value and value creation, the study had to be placed in a specific and (for customers) meaningful context – a context attached to the usage of a particular product or service. Without the consumption context carefully selected and defined, value and value creation could not be successfully explored. Usage or consumption is argued to be the only natural context in which to study the phenomena of value and value creation. However, the usage or consumption process usually happens in the privacy of customers' (or customer controlled) own settings and accessing situations of spontaneous consumption can be a serious challenge for researchers. Therefore, it was necessary to select a type of product where consumption is visible, frequent and easy to recall and describe by informants.

A context that offered good research potential was the use of digital cameras. The arguments for selecting this context were:

- Digital cameras are ubiquitous. Almost everyone has one (at least as a part of mobile phone). For example, in the UK in 2014, DSLR[11] cameras were added to the inflation basket (BBC, 2014). This is a strong indicator of how widespread digital cameras now are, even when it comes to the upper tier DSLR cameras, which account for 50% of all camera sales in the UK (BBC, 2014).
- Technology-based services such as those provided by digital cameras are storable, repeatable, often standardized, while the service creation (i.e. usage) does not have

[11] For photographic glossary see Appendix 2

to involve any direct interactions with humans (Edvardsson et al., 2005; Snellman and Vihtkari, 2003). A characteristic of technology-based services is the fact that they are accessed through some kind of 'service access equipment' (Sandström et al., 2008) in this case via photographic equipment. A camera is, thus, a physical piece of hardware that is required so that the service can be consumed (i.e. capture the photograph).

- Usage of cameras is a relatively frequent, stochastic, sometimes spontaneous and sometimes planned process which enables a good opportunity for the application of the variety of data collection methods.
- Camera users consist of people with different levels of skills and knowledge (from beginners to professionals). This breadth of user profiles represents a good opportunity to examine whether the level of engagement with the product and higher concentration of customer operant resources (photographic knowledge and skills) have any impact on the value creation process and customers' self-perception of their own role in value creation.
- Cameras can range from compact (very simple digital cameras) to modular cameras (semi-professional and professional DSLR cameras). No matter what the type of camera, the camera itself can be extended with a range of additional equipment such as lenses, tripods, flashlights, batteries, filters, remote controllers etc. The extra equipment allows users to combine camera, additional equipment and a range of additional resources in many creative ways to take successful photographs. Modular cameras are generally complex and require advanced photography skills. There are also other resources, like knowledge of participating actors (other camera users, models etc.), that can be shared with camera users and contextual resources that are essential parts of all camera usage (light, scenery, nature).
- The outcome of the camera usage process is photography and this is an artefact of value, according to which customers may assess value and reflect on their value creation practice. The 'quality' of photographs depends on many aspects, including the basic and additional equipment, the photographic environment (context) and the user's knowledge and skills etc. When speaking of camera usage, it is expected that camera users can easily reflect on input resources and disclose what kind of process had to be performed so that successful photographs are created. Therefore, customers are induced to think about value creation practices and created value. Interestingly, it is expected that some customers may find value in the mere

experience of taking a photograph, so this aspect will also be included when studying value as a holistic result of resource integration.

Based on the above, the context of camera usage was considered to be a convenient research context, especially having in mind that the researcher is an enthusiast DSLR camera user.

Chapter 4 explains details of the exploratory phase and provides qualitative findings.

4. Exploratory research: Tapping into the 'black box' of value creation (Study 1)

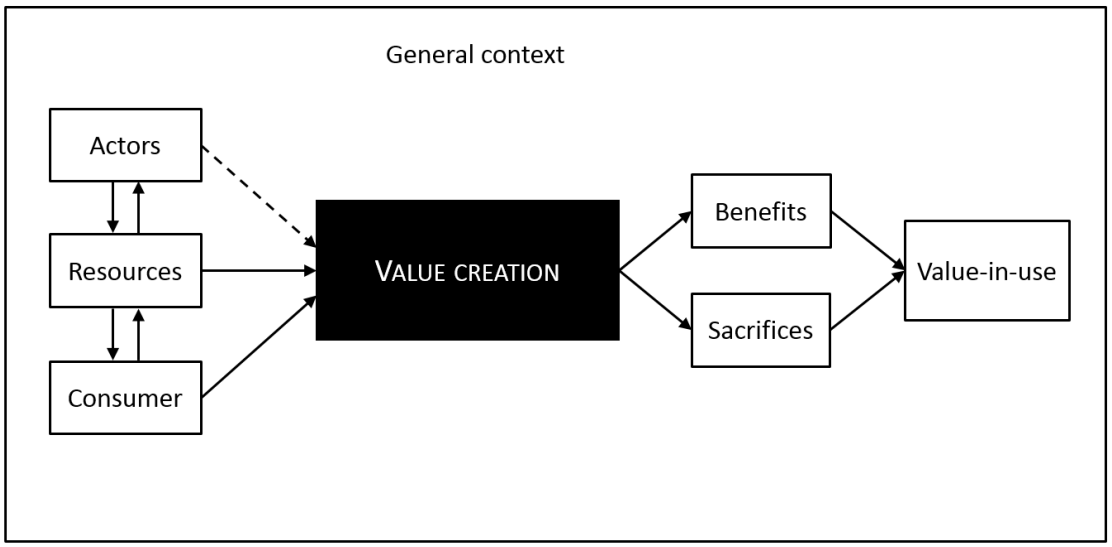
The qualitative exploratory research phase is comprised of Study 1 in which 29 camera users of various degrees of proficiency and backgrounds were interviewed with the aim of providing insights into their value creation practices (camera usage). This Study 1 required an exploratory research approach, given that little was known about the content of the value creation process. The main aim of this study was to identify the content and form of these processes, which is currently articulated as a 'black box' in much of the SDL/SL literature. By shedding light on the components of black box, new insight can be gained into how value is created.

Based on insights from the literature review, an initial qualitative model of value creation was developed (see Figure 2), which served as a starting point for the qualitative phase. The model was built using the extensive SDL/SL literature and the hypothesis that value-in-use consists not only of benefits as argued by Vargo (2008) but also of sacrifices as well (see Aarikka-Stenroos and Jaakkola, 2012; Heinonen and Strandvik, 2009; Mohd-Any et al., 2014). Inputs into the value creation process are resources (both operant and operand) supplied by customers and other actors (Vargo and Lusch, 2004a). Actors other than customers are represented by the dashed lines, since their physical presence in customer consumption is not actually required (Grönroos, 2011b). The inputs are part of the value creation or resource integration process[12] in which resources are transformed into value. This process is represented by the black rectangle in Figure 2 (the 'black box' that this study attempts to illuminate).

A possible way in answering the research questions addressed in this study (see Table 7) was to start from the customer's consumption experiences and understandings, or to see value creation process from the 'inside' (i.e. from the customer's perspective). Given that the consumption of products and services (especially technological goods, such as phones, cameras, computers, banking services, telecommunication services etc.) happens repeatedly, value creation was treated as an episodic phenomenon.

[12] Value creation and resource integration are generally treated as synonyms in the SDL/SL literature

Figure 2: Initial qualitative model of value creation



Looking at the gaps identified in the research literature (Chapter 2), there is still much to be discovered because the theoretical ground of SDL/SL which underpins it is relatively new and underexplored. Given this, qualitative research using semi-structured interviews appeared to be a promising approach. The semi-structured interview method (with a well-crafted interview schedule) was seen as an instrument sensitive to new and previously unknown variables (Denzin and Lincoln, 2005; Folkestad, 2008) buried in the complexities of a social setting such as consumption.

Therefore, the aim of Study 1 was to identify and explore the unknown factors related to the research questions – in particular those specified in RQ1, RQ3 and RQ4. The rest of the chapter explains and justifies:

(a) the choice of the semi-structured interview as a suitable qualitative research method;
(b) the interview schedule;
(c) the data collection approach;
(d) the approach in analysing the interview transcripts; and
(e) the qualitative results/findings.

The chapter ends by proposing an expanded, empirically based, qualitative model of value creation, thus setting the stage for the further, quantitative, confirmatory studies.

4.1. Semi-structured interviews

The exploratory research phase is based on semi-structured interviews conducted either face to face or via computer (over the Internet). The strengths and weaknesses and general features of semi-structured interviews[13] are discussed in this section.

In qualitative research, interviewing is one of the most popular and frequently used methods of data generation (King and Horrocks, 2010; Atkinson and Sliverman, 1997; Silverman 1993). It is a powerful research practice through which a researcher tries to understand customers (Denzin and Lincoln, 2005): the *hows* and *whats* of their everyday lives (Dingwall, 1997; Gubrium and Holstein, 1997). Data gathered via interviews are rich in explanation and good for in-depth understanding of new and complex social phenomena (Van Maanen, 1998).

Interviews can exist in several modalities: individual face to face, group face to face, via telephone and computer-assisted. The interviews can be structured, semi-structured or unstructured (Denzin and Lincoln, 2005). In structured interviews, a researcher strictly follows an interview schedule, while in the unstructured interview the interaction between the researcher and the interviewee generally left to develop naturally as a discussion. The semi-structured interview is more open and more focused on the research agenda than the unstructured interview. This approach allows the researcher to get the best of both structured and unstructured approaches. While structured interviews have a formalised and limited set of questions, semi-structured interviews are flexible, allowing questions outside the schedule to be asked, which enables the researcher to examine interesting issues that emerge during the interview and that could not be anticipated. Semi-structured interviews are thus able to capture data suitable to explain complex consumption behaviours using both pre-established and contingent categories, without imposing any *a priori* categorisation that may be limiting for the inquiry (Fontana and Frey, 2005).

Convers and Schuman (1974: 53) observe that "there is no single interview style that fits every occasion or all respondents". This means that the researcher must be aware of

[13] In general strengths and weaknesses of qualitative methods provided in Table 11 apply to semi-structured interviews

differences between interviewees and must be able to make proper adjustments for any unanticipated developments during the course of the interview. Semi-structured interviews can go in directions that suit both researcher and participant, while the researcher can provide additional explanations, use different prompting to thoroughly explore central and lateral issues of interest, and ensure that the participant's responses have been well understood. This flexibility in working through an agenda empowers the researcher and facilitates the interviewing process.

This said, semi-structured interviews do suffer from some weaknesses and limitations as a research method. Interviews are by no means neutral and objective tools for gathering data, but do suffer from the subjectivity of researchers, given that data stem from the interactions between two or more people (Denzin and Lincoln, 2005). In these interactions interviewees may deliberately try to: (a) provide 'socially desirable' responses; (b) omit certain relevant information; or (c) provide inaccurate responses (Bradburn, 1983: 291). The respondent may also err due to memory issues (Malhotra, 2010). On the other hand, an interview is a demanding research method. A successful interview requires a mix of observational and interpersonal skills, empathic sensitivity, and intellectual judgement, which are difficult to learn and teach (Gorden, 1992). Knowledge of the interviewing technique is not sufficient. Rather it is necessary to understand the interviewee's world and forces that might stimulate or inhibit accurate reporting (Kahn and Cannell, 1957). Furthermore, no matter how carefully the questions are worded or how carefully answers are coded, the spoken words captured through interviews inevitably entail a degree of ambiguity (Denzin and Lincoln, 2005). Finally, the interview research method generally results in long transcripts, which take a lot of time and labour to analyse. In order to overcome these difficulties, the researcher undertook training in interviewing and qualitative data analysis provided by the Graduate School of the University of Nottingham.

Overall, the semi-structured interviewing method was chosen for the flexibility it provides – in particular the possibility of adjusting the inquiry process to the respondent and their unique context and to explore interesting issues that might arise during the interview. This implies that the researcher 'kept his eyes wide open' for all the phenomena that could not be predicted in the process of planning and preparing for interviews. The next section discusses the details of the interview schedule.

4.2. Interview schedule

The interview schedule represents a list of research questions operationalised in a form that is understandable and suitable for the research participants (Lindlof and Taylor, 2002). The schedule consists of interview questions and prompts that provide the interviewer with an interviewing guideline. Also, the schedule helps researchers to maintain the focus of the interview on the topics of interest without constraining them to a particular format (Denzin and Lincoln, 2005). This freedom enables the researcher to adjust questions to the unique interview context/situation and to the people being interviewed.

Research questions in general, as well as in this study, are formulated in a highly theoretical way. To be usable for the purpose of interviewing, the research question had to be 'translated' into a form (interview questions) that could be understood by respondents (with regard to the selected research context of camera usage). Table 15 lists the interview questions (in bold) and prompts (in brackets), and explains the purpose of each question; the 'research question' column shows to which research question a specific interview question relates.

Table 15: Interview schedule and rationales for asking interview questions

IQ#	INTERVIEW QUESTION [PROMPTS]	RATIONALES	RQ#
1	**What does photography mean to you?** [Is it a bare necessity/hobby/profession?]	The opening question had the aim of directing informants to think about photography in terms of personal consumption. The aim was to reveal the value camera users draw from their camera usage. The question might also identify the general or preferred context/settings in which cameras are used. Furthermore, the question might indicate a customer's level of knowledge, consumption involvement, and value creation capabilities. The question could also indicate the quantity and quality of resources a customer brings into consumption. For example, it is expected that professional photographers bring a high level of operant resources (knowledge and skills) into value creation (Normann, 2001) and, therefore, have greater potential for value creation (Baron and Harris, 2008; Vargo, 2008) than do hobbyists.	G, 1
2	**What kind of photos do you take?** [Why do you prefer taking that kind of photos? What about portraits/night pictures/nature/macro/sports?]	The question aimed to explore whether users could be profiled by the specific types of photographs they took (i.e. portraits/night picture/macro/landscape etc.). It was expected that profiled and non-profiled users could provide different perspectives on value creation practices given that they (most likely) bring different kinds and different levels of resources (Vargo and Lusch, 2006; Normann, 2001). It was expected that a more profiled user would, most likely, have a higher level of knowledge and skills about what a particular camera usage setting requires in terms of equipment, skills, knowledge etc.	G, 2
3	**Tell me about your current photography equipment** [Tell me about your camera itself]	Without the camera/photographic equipment there is no photography. The equipment's performance, which is the essential operant resource, is a part that warranted specific research interest. The equipment possessed (and its performance) might be a significant indicator of a customer's photographic proficiency. Finally, the photographic equipment is always part of the resource portfolio that is applied in value creation and, therefore, has to be examined (Lusch, 2011).	G, 1
4	**Why do you think you chose your current camera?** [Was this your most recent purchase of photography equipment? Tell me more about your most recent purchase]	The question explored what was important for users at the point of making a camera purchase decision and how a camera's value in exchange was assessed by a customer (Zeithaml, 1988). This question was also expected to reveal the needs of customers and how they determined which camera might match their needs at the best price at the time of purchase.	1, 3

Table 15 (continued): Interview schedule and rationales for asking interview questions

IQ#	INTERVIEW QUESTION [PROMPTS]	RATIONALES	RQ#
5	**Tell me a bit about your expectations before you purchased your camera/piece of equipment** [How do you feel about your camera/piece of equipment against you expectations?]	The question explored whether and how customers create a connection between value-in-exchange and value-in-use. Also, the question was proposed to examine whether the criteria that served as vital in the purchase decision play the same role in the value-in-use assessment (Zeithaml, 1988).	1
6	**What do you appreciate about your camera?** [What about ease of use/performance/quality/brand/range of additional equipment you can add /software/supplier support?]	This question aimed to explore the benefit sides of a camera's value-in-use (Vargo and Lusch, 2008a).	1, 4
7	**Are there any negative aspects in terms of usage of your camera?**	These two questions examined the existence of sacrifice elements of value-in-use of a camera (Zeithaml, 1988; Oliver, 1999; Slater and Narver, 2000; Walter et al., 2001 and Eggert and Ulaga, 2002).	1
8	**Do you ever reflect back on the price you paid for camera/equipment?** [Can you remember what it was that made you reflect? Does this have anything to do with your impression of the camera/equipment now you are using it?]		1
9	**What do you think makes for a good photo?** [What about camera/additional equipment/ advice etc.? How much of a good photo is based on your skill or knowledge? A little bit more specific - what do you think makes the biggest difference: equipment or knowledge and skills of photographer? Could you tell me a little bit about why you have suggested equipment over knowledge and skills (or knowledge and skills over equipment)?]	Camera usage results in an artefact of usage – a photograph. It was expected that users partially assess the value of photographic experiences through the quality of their photographs. By asking these specific questions, the trap of making a respondent focus only on the camera is avoided. This question tested whether a customer's operand resources (knowledge and skills) are recognized by the customer as an integral part of value creation. Another important aim was to see how customers perceive their roles in the value creation process.	1, 2, 3, 4, 5

Table 15 (continued): Interview schedule and rationales for asking interview questions

IQ#	INTERVIEW QUESTION [PROMPTS]	RATIONALES	RQ#
10	**Can you tell about the types of occasions on which you use your camera?** [Typical types of occasion: travel, events, fun, indoor, night. How did your pictures turn out on these occasions? What do you think is behind that? For example, lightning/equipment/your knowledge and skills/context. Is it important that your camera performs well across different usage occasions?]	The question examined how value creation practices change when the context is changed. The question tried to establish whether the context of photographing offers certain resources that can be combined with resources in a customer's portfolio. Also it explored whether the different contexts require a customer to rearrange resources and adjust their consumption practices. Finally, it examined whether and how a customer matches their operand resources (knowledge and skills) and how they draw more resources into value creation to be able to create successful photographs in different contexts of camera usage (Vargo and Lusch, 2008a).	G, 1, 3, 4
11	**Do you talk to others about photography?** [Who are they? Why them? How do you interact with them: face to face, blogs, societies, seminars, social networks etc.?]	The question explored whether the customer recognised other camera users/actors as resource providers (Schau et al., 2009).	G, 2
12	**Can you tell me about people whom you have interacted with (either directly or indirectly) who you think have influenced your practice of taking photos/ your thoughts on cameras/photography?** [How they influenced you? What did they provide/share?]	The question aimed to explore which actors are recognised to be important for a camera user's value creation processes, how important they are, and what kind of resources they have supplied to the camera user in the past (Grönroos, 2009).	2
13	**Do you feel like you have a relationship with the camera supplier/manufacturer?** [What kind of support have you received from the camera supplier/manufacturer?]	The question examined whether a customer's relationship with supply-side actors is a source of value, as Grönroos (2000) argues.	2, 4, 5
14	**Do you think you use your equipment to its full potential**	The question explored whether a customer recognised their full operant capacity and opportunities to create "more" value with and from the resources they had at their disposal (Lusch and Vargo, 2006). This was particularly interesting in terms of the equipment a customer uses.	1, 4, 5
15	**How did you figure out what the equipment could do?**	The question aimed to identify the approaches to learning about equipment and how a customer's operant skills are built through different ways of learning (McColl-Kennedy, Vargo, Dagger et al., 2009).	2, 3

Table 15 (continued): Interview schedule and rationales for asking interview questions

IQ#	INTERVIEW QUESTION [PROMPTS]	RATIONALES	RQ#
16	**What do you think would help you to get better pictures?**	The question examined whether and how customers critically evaluate their value creation practices and whether they have ideas about what is required so that they can create more value (McColl-Kennedy et al., 2009).	2, 4, 5
17	**Can you tell me about your first camera?**	These questions were general and assisted in creating a more detailed picture of an interviewee.	G
18	**How did you get into photography?**		
19	**Have there been any times when you felt that you made significant progress in your picture-taking abilities?** [Tell me more about these]	This question examined what kind of 'new' resources and events significantly improved value creation practice in the past (McColl-Kennedy et al., 2009).	G, 2, 3
20	**Tell me more about yourself?** [Age/Other hobbies/Education]	This question aimed to capture general, demographic, behavioural and other relevant information about a respondent.	G

Notes: IQ# – the interview schedule question number, RQ# – research question number, G – question with a general purpose, not aimed in providing responses to any particular research question

4.3. Data collection approach

For the data collection approach in Study 1, the following issues were considered:

1. *SAMPLE SIZE* (How many participants are needed?);
2. *SAMPLING* (How will the participants be given a chance to participate in the study?); and
3. *DATA COLLECTION EXECUTION* (How are the data going to be collected?).

Each of these is discussed below. A range of problems were addressed at each phase and solutions were provided so that the best quality data were obtained, given all the constraints.

4.3.1. Sample size

Denzin and Lincoln (2005) argue that qualitative studies generally employ smaller samples than quantitative studies. A key question is: What sample size is sufficient for a qualitative study such that research rigour is established? For example, Sandelowski (2007) argues against having any rules of thumb and states that the adequate sample size is ultimately a matter of the researcher's judgment and experience in evaluating the quality of the collected information against its purpose. Indeed, a number of qualitative researchers tend to collect data up to saturation point, defined as the point at which the new interviews cease to bring new information and insights (Mason, 2010). However, Guest et al. (2006) criticise the saturation idea, arguing that it fails to provide a practical guideline in estimating sample size for robust qualitative research. A number of scholars recommend that for interview-based studies qualitative samples contain 20 to 60 informants (Morse, 1994; Bernard, 2000). Given that Study 1 was not the only study in this doctoral research, the study itself had to be treated as a smaller qualitative research project, which, according to Charmaz (2006), requires at least 25 participants. Therefore, the plan was to apply a compromise solution and to conduct at least 25 interviews, and thereafter to increase the number of informants to the point of saturation.

4.3.2. Sampling: judgemental sample

Given that generalizability was not the goal of the exploratory research phase, rather thorough understanding and explanation of the value and value creation phenomena, it was decided to choose one of the non-probability sampling techniques. Qualitative researchers generally use non-probability sampling techniques to obtain their samples (Marshall, 1996). This choice is determined by many reasons, such as:

- Qualitative research is labour intensive and focused on in-depth understanding and explanations (Crouch and McKenzie, 2006);
- Generalisation of findings is not an aim of qualitative research (Denzin and Lincoln, 2005) and therefore there is no particular need for random samples, even when they are feasible to obtain;
- If the small samples needed for qualitative research were obtained using probability sampling, the results would suffer from a high sampling error, thus rendering the probability sampling pointless (Marshall, 1996);
- Qualitative researchers usually do not know the characteristics of the target population, and so would not know whether the sample of informants is representative of the wider population. Rather, they want informants who are representative of particular social settings, behaviours and experiences (Crouch and McKenzie, 2006);
- People have different capabilities in explaining their own and other people's experiences and behaviour. Based on this argument, qualitative researchers seek those informants who are more likely to provide well-articulated insights and understandings (Marshall, 1996).

In Study 1 purposive (non-probability) sampling was applied. Purposive sampling is a form of convenience sampling that finds its application in exploratory studies (Adler and Clark, 2007). Based on their personal judgement of an informant's appropriateness for the study, the researcher selects participants who are expected to facilitate an investigation. Even though purposive sampling relies on researcher's choice of interviewees, generating a representative sample is still feasible (Denscombe, 2010). In this doctoral research the idea was to have a sample comprising approximately one-third beginners with basic equipment (compact camera), one-third intermediate users with average equipment (compact zoom or

entry level DSLR camera), and one-third proficient users with professional equipment (professional DSLR camera). It was hoped that all would be able communicators eager to report in detail their reflections, experiences and behaviours with regard to camera usage. This was only a vague guideline in selecting informants, and by no means a criterion for quota sample. Using this approach sufficient information from different types of camera users was gathered and different user profiles were well represented in the study.

4.3.3. Data collection

The call for interviews was disseminated online via: (a) the University of Nottingham Intranet portal, which is visible to both students and staff; (b) a mailing list of the Nottingham University Photo Society; and (c) social network sites, such as Facebook, LinkedIn and Twitter. All participants were promised full anonymity and a £5 Amazon voucher for their participation. It was estimated that an interview would take approximately 40 minutes. The £5 reward was established using the minimum hourly wage in the UK for comparison. If respondents spent the estimated 40 minutes for the interview it would earn them a sum that was, pro rata, 20% higher than the minimum hourly wage of £6.19 in 2012 was (UK Government, 2012). There were two inclusion criteria: (a) English-speaking adults; and (b) owners of a camera of some description. It was assumed that camera ownership is an important indicator of whether someone is a camera user or not. Furthermore, it was assumed that there was a greater chance that a camera-owner would have recently used a camera and would be able to recall their most recent camera usage. These criteria were monitored using screening questions built into the online application form for Study 1. The inclusion criteria were necessary but not sufficient for accepting an applicant. The researcher also got in touch via email or phone with potential informants to estimate their suitability for interviewing.

In total, there were 54 applications and 29 were selected for interview. The sample was selected to get the most heterogeneous group so that the views, experiences and opinions of diverse types of camera users (different proficiency level, different equipment type etc.) could be included in the analysis. The socio-demographic and behavioural characteristics of the sample in Study 1 are presented in Table 16.

Table 16: Study 1 socio-demographic and behavioural sample characteristics

INTERNATIONAL SAMPLE (n=29)	VALID %	FREQUENCY
GENDER		
Male	62.07%	11
Female	37.93%	18
EMPLOYMENT STATUS		
Employed	37.93%	11
Retired	3.45%	1
Student	58.61%	17
COUNTRY		
UK	51.72%	15
Serbia	13.79%	5
Nigeria	6.90%	2
China	3.45%	1
Ghana	3.45%	1
Greece	3.45%	1
Iran	3.45%	1
Portugal	3.45%	1
Romania	3.45%	1
Trinidad and Tobago	3.45%	1
AGE		
$\bar{X}$ =33.4, Median=29, Mode=22, σ=13.9, X_{min}=21, X_{max}=80, $X_{.25}$=24, $X_{.75}$=35.5		

INTERNATIONAL SAMPLE (n=29)	VALID %	FREQUENCY
MAIN PURPOSE OF USAGE		
Need	13.79%	4
Pleasure	62.07%	18
Part of job	6.90%	2
Profession	17.24%	5
CAMERA TYPE		
Smartphone/Mobile phone camera	6.90%	2
Compact system/Mirrorless camera	44.83%	13
DSLR camera	48.28%	14
LEVEL OF PHOTOGRAPHIC KNOWLEDGE		
1 – not knowledgeable at all	3.45%	1
2	6.90%	2
3	27.59%	8
4	13.79%	4
5	17.24%	5
6	17.24%	5
7 – very knowledgeable	13.79%	4
FREQUENCY OF CAMERA USAGE		
1 – very infrequently	0.00%	0
2 – infrequently	6.90%	2
3 – relatively infrequently	13.79%	4
4 – neither frequently nor infrequently	20.69%	6
5 – relatively frequently	20.69%	6
6 – frequently	20.69%	6
7 – very frequently	17.24%	5

A digital voice recorder was used to record the face-to-face interviews, while Skype[14] and MP3 Skype Recorder 3.1[15] were utilised for the computer-assisted interviews. Combining these two interviewing modalities (face to face and internet) was fully acceptable given that the different approaches have no impact on the quality of data (Bryman, 2008). A number of interviews were conducted on the premises of Nottingham University Business School, but also in tea shops and other places convenient for informants.

Pilot interviewing started in May 2012. After the first 6 interview transcripts had been prepared and analysed, several modifications were made to the original interview schedule. The main corrections addressed problematic wording of some of the questions. It was noticed that directly asking what customers consider 'value' to be was confusing and resulted in demands for further clarification of the term. Therefore, it was decided to ask a question about value-in-use in a more indirect fashion, for example "What do you appreciate about your camera?" The other correction was related to how the interviews were conducted. The supervisors suggested attempting more probing during the interviews to generate greater depth of evidence from the interviewees. Following these alterations to the schedule, another 23 respondents were interviewed between July and September 2012. The interviews took on average 34 minutes and 29 seconds. All participants were given £5 Amazon vouchers as a small token of thanks for their participation.

4.4. Data analysis approach

To turn audio records into digital transcripts, the services of a reputable transcription professional were used. The first step in the data analysis was to code the interview transcripts. The initial qualitative model (see Figure 2), as well as the literature, informed the initial coding. Coding and analysis were performed using NVivo 10[16] the software for the management, organisation and analysis of qualitative data. The coding of the textual data is a very important step in the analysis, given that this procedure allows the researcher to condense extremely rich and comprehensive textual data in a form that is convenient for induction and data representation. "Codes serve as shorthand devices to label, separate,

[14] www.skype.com
[15] www.voipcallrecording.com/MP3_Skype_Recorder
[16] www.qsrinternational.com/products_nvivo.aspx

compile and organize data" (Charmaz, 1983: 186). The essence of coding is to identify a chunk of text of any length that contains, belongs to, or represents a certain phenomenon of interest (Spiggle, 1994) and then to assign it to a defined code (or, in NVivo terms, *node*). The beauty of qualitative data lies in the fact that one section of text can be assigned to multiple codes if it simultaneously entails or explains multiple concepts of interest.

The analytic technique applied for the qualitative analysis was thematic content analysis. This requires a list of predefined themes (or a matrix) by which raw data can be ordered, classified and synthesised (Ritchie et al., 2003). As suggested by Bryman (2008), the idea of thematic analysis is to construct an index of central themes and subthemes that is incrementally revised and expanded as the analysis progresses and new knowledge emerges from the data. In NVivo, the initial list of codes was created by forming nodes and child-nodes. Before data analysis, 33 themes or *a priori* nodes were created based on the relevant literature and initial conceptual model (see Figure 2). This framework was then applied in this first iteration of data analysis. The coding and analysis were tentative and incremental. In total, 12 iterations of coding were performed. In each iteration the set of the nodes/codes was gradually expanded through in-vivo analysis. This means that the researcher began with a single theoretical framework with the aim of exploration and gradual theory-building, refinement and complementing of this framework (Andersen and Kragh, 2010). The final iteration ended with 489 nodes, of which 12 were top-level (mother) nodes. The process of coding and analysis was inspected several times by two supervisors to improve the credibility of the qualitative research. Having credibility, especially in qualitative analysis, means that the researcher is not alone in what they see in their data (LeCompte, 2000).

The analysis of the qualitative data took approximately six months. Once it was done, the results enabled the researcher to produce a qualitative model of the value creation process and also explain features of value-in-use and the value creation awareness/self-perception of camera users. The qualitative findings are provided in the next section.

4.5. Findings

The main aim of the Study 1 was to give insights into the 'black box' (Grönroos, 2011; Leroy et al., 2013) of value creation (addresses the most significant literature gap – RQ3). In addition, answers to RQ1 and RQ4 are also provided. The chapter is structured around answering RQ3 given that this research question provides the most logical structure for the discussion and presentation of findings. All the building blocks of the value creation model proposed in this document, as well as the relationships between these building blocks, are discussed, illustrated and supported with evidence in the form of interview quotes. To secure anonymity, the respondents are simply designated X1–X29.

The next section explains: (a) the inputs into value creation (customer, resources, actors); (b) the five identified phases of the value creation process; and (c) the outputs of the value creation process.

4.5.1. Input into the value creation process

The sphere of a customer's consumption interest (the wider consumption context) has a direct relationship to a particular consumption topic (theme) in a customer's life. In studying the consumption topic (cameras) it is clear that around the topic there is a complex network of actors/participants and that interaction between actors can emerge and be dissolved. These complex and dynamic network connections can be described using a *customer-resources-actors* structure.

As the name itself describes, a customer's consumption interest is sphere (related to customer's relevant consumption topic) from which a customer can (but not necessarily has to) progress to actual consumption, where resources are turned into or applied in service. This means that a customer can undertake a number of activities (research, learning, sharing, buying, selling etc.) related to the consumption topic that do not include consumption or usage of the product or service.

The following quotes illustrate the sphere of consumption interest and clarify the distinction between this sphere and actual consumption.

"I work in an art gallery so I talk with people about photography…I talk to my friends about photography and about the ideas and about the framing, about graphical issues…It's helpful to talk about your photos, or their photos…" **X5**

X5 is an artist photographer. Outside any actual camera usage, he frequently interacts with other people on the subject of photography. This interaction involves sharing of ideas, information and experiences. He talks about different concepts and techniques with a number of different actors (gallery visitors, friends), where his knowledge is being expanded. As shown, the interaction between the actors revolves around and is mediated by resources (knowledge, skills and photographs) that are of importance for the actual camera usage.

"I talk [to others] only through my photography; I have my blog, where I post my work, I don't like to write about it, for me it defeats the purpose. I am following a lot of other photographers' work, tech blogs, and visual inspiration… I like to read everything that I can get on the subject of some camera, reviews, comparisons, thoughts, so I can get the picture as wide as I can, even I like to test the camera, before I decide to buy. People are talking of pluses and minuses of some camera features. I look how that will manifest in my workflow and then decide is that acceptable or not." **X12**

X12 is explicit when he describes interactions with other actors. He emphasises that these interactions are mediated by photographs. As said before, actors interact through resources that are important/relevant for their consumption/usage processes. A photograph is a value artefact and can be used as a source of knowledge or idea or inspiration. X12 shares his work, but also follows the work of others, and has an interest in the latest photographic equipment and its features. In this case, the customer is doing a lot of reading and research around the topic interest and thus he is building his knowledge and resources. X12 also explained that he likes to test equipment before making a purchase decision, thus illustrating progress from the sphere of consumption interest to the actual consumption/usage. The trial of equipment itself can be understood as one usage episode.

"it's really interesting [the DeviantArt website] because it gathers photographers from all over the world… you can always browse around and see how people can

create…other viewers can always evaluate your pictures…vote on them, comment on them and ask you about various things. You can learn a lot from that… website because… artists, professional photographers and that kind do post …all kinds of tips and tricks." **X14**

X14 is active on a website forum called DeviantArt, where customers engage in the free sharing of photographs, advice, photography and feedback. Here, customers benefit from these exchanges by building their understanding of photography practices and techniques.

The previous quotes show the existence of a customer's consumption interest (wider consumption context). An interest in a consumption topic can exists in a customer's life over a shorter or longer period of time, while the actual consumption can happen in one or more usage/consumption episodes (Verhoef et al., 2009; Kleinaltenkamp et al., 2012; Roggeveen et al., 2012). It is apparent that customers and other relevant actors interact through and around resources that are important for service and value creation or, to be more precise, that are important for actual consumption. This is aligned with the view of Håkansson et al. (2009), who see resources as foundations of customer-supplier interactions. Interestingly, this interaction does not necessarily have to involve consumption, but can also be distinct from it (engaging around certain consumption topic does not imply consumption or, in this case, camera usage).

The following three sections will give insights into the resources, customers and actors as integral parts of the complex networks/structures that can exist in both the wider consumption context and the actual consumption (value creation).

4.5.2. Resources as input in value creation

A customer starts the consumption process in order to satisfy a certain need. For this, customers need resources that will be applied or integrated into a service and optionally need the presence and/or assistance of other actors (resource suppliers). Therefore, resources are crucial to service and value creation. In this qualitative research, several categories were derived for the classification of resources. The resources can be classified under one or more categories. Namely, in this work, based on empirical findings, resources

were observed using two newly developed classification: (a) classification according to the type of access to the resource; and (b) classification according to the resource type. The classifications will be given and summaries upfront and then illustrated with appropriate quotes.

RESOURCE CLASSIFICATION 1: ACCESS TYPE. This classification, based on Vargo and Lusch (2011), Kleinaltenkamp et al. (2012) and Hilton and Hughes (2013), distinguishes between resources based on how a customer or an actor accesses a certain resource:

- ***RESOURCES IN PREVIOUS OWNERSHIP AND/OR RESOURCES WITH FREE ACCESS.*** These are resources that customers have at their own disposal, have ownership of or have free access to (*private resources* and/or free *public resources*) (Vargo and Lusch, 2011). A resource in this particular group might have once been obtained by a customer through market exchange, but now this resource is in a customer's portfolio and can be included in consumption with no limitation in access.
- ***RESOURCES THAT REQUIRE MARKET EXCHANGE IN ORDER TO BE OWNED OR ACCESSED.*** These are resources where a customer has to engage in an economic exchange to get access to or ownership of a resource of choice (*market-facing resources*) (Vargo and Lusch, 2011). This usually happens when customers have insufficient private resources (Hibbert et al., 2012). Value-in-exchange emerges in the process of market or economic exchange, when the customer participates in the market exchange for resources of another actor/supplier. Having said this, in this study it is recognised that some actors are inherently market/profit driven (they provide their resources through economic exchange in which they seek revenue and profit as a compensation for the resources provided).

There are several reasons why this classification was proposed. First, this classification was prominent in the informants' narratives. Second, as Kleinaltenkamp et al. (2012) argue, there are fundamental preconditions for resource integration, including actors possessing the ability and allowance to use or integrate a resource. In most of the cases, customers will have to engage in market exchange if they do not own or cannot create a resource needed for consumption. Namely, by using this classification, an attempt was made to establish a clear connection and distinction between value-in-exchange and value-in-use, and to show how and where these two types of value emerge and how different their natures are.

Therefore, resources that were the subject of exchange became a proxy to address where and how value-in-exchange emerged. And third, the motivation behind the way an actor shares and accesses resources determines their behaviour in relation to other actors (Vargo and Lusch, 2011).

RESOURCE CLASSIFICATION 2: RESOURCE TYPE. The resource type classification builds on the default SDL/SL resource classification that distinguishes between operant and operand resources (Vargo and Lusch, 2004a; Ng and Smith, 2012). SLD/SL establish that operant resources (knowledge and skills) are applied in consumption either directly (through a physically present actor – see Grönroos 2011b) or indirectly (through a product, see Vargo and Lusch 2004a), while operand resources are resources upon which operant resources act to create an effect. Despite all the theoretical merits of this classification, to be practically useful, the default classification needed an additional step – a contextualisation to a particular consumption setting so that the resources can be identified in a more concrete/specific fashion. The following classification was drawn from the qualitative findings by categorising different types of operand and operant resources into coherent groups according to certain features they shared (for example the source or the purpose they served). Therefore, this classification distinguishes relevant coherent groups of operand and operant resources for the context of camera usage so that the importance and contribution of each can be easily identified in the process of value creation. The classification distinguishes between 6 broad resource types:

- ***USAGE CONTEXT EPISODE SPECIFIC KNOWLEDGE.*** This customer-sourced operant resource is part of the domain of the customer's photographic knowledge that is related to how well the customer was able to understand and recognise what was required in their most recent camera usage episode so that a successful photograph could be produced.
- ***SPECIFIC KNOWLEDGE ABOUT EQUIPMENT USED.*** This customer-sourced operant resource is part of the domain of customer's photographic knowledge that is related to how much the camera user knew about the equipment that was employed in the most recent camera usage event so that a successful photograph could be produced.
- ***SKILLS.*** These customer-sourced operant resources represent a customer's practical (hands-on) ability to take successful photographs.

- ***EQUIPMENT PERFORMANCE.*** This equipment manufacturer-supplied operant resource embodied in the product(s) represents the ability and versatility of the product to capture a successful photograph.
- ***CONTEXTUAL RESOURCES.*** This broad group of operand resources is freely accessed from the environment in which the customer took photographs. In the case of camera usage, this includes light, scenery, ambiance, event, moment etc.
- ***CONTRIBUTION OF PARTICIPATING ACTORS.*** This broad resource group encompasses both operand and operant resources supplied by actors physically present in the process of camera usage. For example, the actors can contribute to the success of a photograph by posing or by giving advice to camera user so that a successful photograph is produced. The contribution of participating actors is relevant only when other actors are physically present in the process of camera usage.

The empirical evidence supporting this classification will now be presented.

4.5.2.1. Resources classified according to the type of access

Resources with free access

X2 borrows equipment from other camera users. She named several usage episodes for which she had borrowed camera (wedding, summer holiday etc.). In her case the cameras mentioned are resources with free access:

> *"…I don't have a digital SLR but my boyfriend does and I can use that one… I went to my cousin's wedding …and my sister was at that so* ***I got to use her camera*** *so with that I took some really nice pictures because her camera was really nice… then I took some pictures last week on my holiday as well. Again I got to use her camera..."* **X2**

X3 is not just using the free resources of other actors, but she also shares she owns. In this case she shared with other customers her equipment and knowledge. She also became an

active actor in someone else's usage episode by offering her own resources (knowledge and skills) for free.

> *"…recently,* ***I had to give my camera*** *out because someone wanted to use it… when I've seen someone taking a picture and the pictures are not turning out good I'm like 'oh, you can do it this way [showing with hands how camera should be manipulated]; why don't you take it from like this [showing with hands how camera should be manipulated]?... why don't you put on the flash' you know…"* **X3**

As shown in the case of X3, actors and resources are not fixed inputs, but rather dynamic inputs that can be modified expanded or contracted during the course of actual consumption, sometimes even on the initiative of the actors who are not beneficiaries of the value created in the process, or who were not present from the very beginning of the act of consumption.

X26 gives examples of companies providing free access to the whole resource set, for the purpose of promoting their newest equipment. In this case the companies gave temporary free access for the purpose of trial and promotion that can lead to sales.

> *"…companies like Nikon or Canon… have their stand with all their newest cameras and then they have a model standing behind and so people coming to the show can try their new cameras with the model standing there for them..."* **X26**

Resources that require market exchange in order to be accessed

X20 as a beginner has a small compact camera. However, he would like to own or have access to a DSLR camera in order to be able to take "*professional looking photographs*". In reality, a lack of funds prevents this access to a desired resource. X20 sees the mentioned DSLR camera as a resource that requires market exchange in order to be owned/accessed.

> **"**…I have a portable camera, a little compact camera… and although I would… really like a big, a DSLR camera, nice ones, at the moment I don't have any money which is

such a shame because I would love a nice big camera to take professional looking photographs." **X20**

X19 is a passionate diver who recognized that he does not have the necessary skills or equipment to take photographs under water. However, he sees both as resources that can be obtained through purchase.

*"**…**when I first started I was never interested [in taking photography classes], never. It was just the thought of it as kind of 'oh I really need to improve the skills and I really have to do some skills on this'. But, more recently I've been considering actually taking… a course that teaches you how to do underwater photography… And so that's something that I'm actually considering but, of course, it is very expensive, not only the course but the material because you can either get a camera and then get a box and you put the camera in, a normal camera would work, for example, or you then buy a camera, a specific camera for under water."* **X19**

Customers can also act as suppliers and offer their resources for market exchange. X12, as a professional photographer, has a wide range of equipment. His portfolio is also always changing. He argues that he always follows the prices of the equipment so he can offer his equipment for sale once there is a good opportunity to upgrade.

***"**I always know the [market] value of the camera, what [it] was and [what] it is now, because I am always looking to sell my old one and upgrade to new."* **X12**

As demonstrated in section 4.5.2.1, customers can employ resources with free access and or resources that require some form of exchange. Resources with free access can be, for example, owned (see X3), borrowed (see X2), or made available for a trial use (see X26). Resources that require exchange (see X20, X19 or X12) can be accessed through purchase, rent or leasing. These examples provide an additional perspective on resource classifications provided by Hilton and Hughes (2013), Aarikka-Stenroos and Jaakkola (2012), Moeller (2008) and Vargo and Lusch (2011) and enable observing resources through the *access type to resource* lens. This classification, therefore, acknowledges: (a) customer's networks (from which a customer can freely source resources); (b) cases in which suppliers intentionally

allow customers a temporary and a free access to their resources (most likely hoping that such trials will end in an exchange); and (c) actors driven by profit which was not explicit in previous SDL/SL literature.

4.5.2.2. Resources classified according to the resource type

Usage context episode specific knowledge

X6 points to situations where he had no knowledge of what the particular photographic context required and so was not able to create successful photographs. In particular there was an absence of knowledge regarding what kinds of camera settings were required.

> *"…previously **I knew nothing** about ISO[17] or shutter speed or anything to make adjustments for night shots and they shoot some beautiful stars and they use long time exposure, 'cause I didn't know anything about that, so I just try to take down the parameters and it really works."* **X6**

X13 explains how essential knowledge of the effect of taking photographs against direct light was and how important it is for a photographer to know the requirements of each photographic context. In this case it was necessary for her to change her position, otherwise the focal subjects would remain underexposed and thus the photographs would turn out bad. Therefore, she knew (or she learned through trial and error way) what had to be done in order to get a good photograph.

> *"I had to play around a lot the other day to get a good photo because there was light coming from one end of a room and not the other… and if you don't kind of think to do that kind of thing you're never going to get a good photo… so it's really, really depends on your setting…"* **X13**

X26 gives examples how different usage purposes (episodes) require different lenses. She explains how taking a photograph of very small subjects (insects, water droplets, small

[17] See Appendix 2 for photographic glossary

flowers) requires one type of lens, while taking photographs of landscapes requires other types of lens. This implies that according to different usage settings and photographic goals, different equipment is needed in order to produce good photographs.

> *"…different kinds of pictures require a different sort of lens that might work with them. For example macros – a macro lens would be ideal for me that's why I've got a macro lens and that's why I bought a macro flash because it allows sometimes it actually allows better lighting on the subject… wider angle [lens] good for landscape more spaces sometimes for more weird effect pictures which wide angle can do…"* **X26**

Usage context episode specific knowledge is theoretically closely related to the concepts of *knowledge for problem solving* in particular consumption situation (Bettencourt et al., 2002) and *customer's cognitive ability* to match his own resources to the demands of context (Hilton and Hughes, 2013). In this case this concept represents customer's photographic knowledge to select, adjust and integrate the resources within the given context and given constraints so to create a successful photograph. However, the proposed label enables a better emphasis of the importance of value creation context (Grönroos and Gummerus, 2014; Karababa and Kjeldgaard, 2013; Chandler and Vargo, 2011; Vargo et al., 2010; Vargo, 2008; Edvardsson et al., 2011; Helkkula et al., 2012; Epp and Price, 2011; Gummesson, 2006; Grönroos and Voima, 2013) and the uniqueness of the discrete value creation episodes (Roggeveen et al., 2012; Verhoef et al., 2009).

Specific knowledge of the equipment used

X16 emphasises how it is essential to be knowledgeable on how to operate a camera. If a user does not have the knowledge to configure a camera, the results of the photography are generally poor, and can even result in no photograph being taken.

> *"…you need to know how to use the camera, if you're there at the right moment and press the shutter but again you've got the settings wrong or you haven't got the lighting correct then, again you've got no picture…"* **X16**

X17 adds that knowing how to use the equipment is liberating and the enabler of a successful photograph.

> *"I know… everything I need to know about aperture priority, shutter priority, using fully manual… it's just a matter of knowing the equipment. I can fumble around in the dark and take pictures with this camera, I know where everything is, I know the buttons, I know where the settings are, I know what to do to change things, I don't have to look so it frees me, you know, from the constraints of worrying about equipment, about technical aspects…"* **X17**

When asked about what is crucial for getting a successful photograph X18 emphasised knowing how to use equipment. He went so far as to say that everything else is meaningless.

> *"…you need to know how to set that for your light meter, you need to know where your aperture, apertures are, where your shutter is, where you're shutter speed is, the rest is, as an old boss would say, just propaganda, it's, the rest is meaningless."* **X18**

Technology (i.e. equipment, software) is often central to the value creation, and the role of customers interacting with technology is a key issue within service systems research (Maglio and Spohrer, 2008; Kleinaltenkamp et al., 2012; Sandström et al., 2008). Bettencourt et al. (2002) also recognised the importance of technological knowledge and information customers have on their disposal when using technology in their value creation. Therefore, specific knowledge of the equipment used, in this case, technical knowledge regarding the camera and what it can do (see X17), how it should be used (see X16 and X18), is confirmed to be a very important operant resource that a camera user brings to consumption. The *usage context episode specific knowledge* together with specific knowledge about equipment can be regarded as components of general photographic knowledge.

Skills

X11 refers to skills using words such as ability and talent. Furthermore, skills are illustrated by X11's quote who compares two situations, for instance a user with a great camera who creates a "stupid" photograph that "says nothing" and another user who takes a picture of the same thing using a very basic camera but produces a successful photograph. Keeping

contextual resources constant, what makes the difference is actually the skill of the photographer, not the quality of the camera.

> *"It takes a good camera, good equipment and the ability to come to a point to choose a perspective of a photo, because sometimes different people take photos of the same stuff, but someone can choose a great perspective and to choose a moment, to know when to shoot and you get stupid photo which says nothing and which is done with a great camera and you have [a] photo that is done by what you call it, a point and shoot camera which is great. So the talent of a person to choose the perspective and the moment [is vital for a successful photograph]"* **X11**

X14 also emphasises the importance of skills, and distinguishes skill from knowledge. She says that talent is important for producing a successful photograph.

> *"…[to take a successful photograph] you could have not too much knowledge about cameras and photography in general but, you know, to have a certain talent and certain, you know, certain skills…"* **X14**

Similarly to what X11 said, X20 argues that once the camera user gets advanced (high-performing) equipment, it is necessary to develop skills, as a practical hands-on ability, to use the camera. Without skills it is unlikely that good photographs will be produced by the camera user.

> *"…if I was to get an expensive, professional camera, I would need to develop my skills in order to take that nice photo and to get a really good shot…"* **X20**

Skills are always recognised as an important operant resource in SDL/SL literature, but seem not to be sufficiently distinguished from knowledge rather coupled with it (see Vargo, 2008; Vargo and Lusch, 2008a). However, the data showed a clear distinction between knowledge and skills. When speaking of skills, informants often drew on a set of closely related concepts or synonyms such as: creativity, talent, experience, ability, capability, doing the right things all distinct from knowledge. These quotes (such as X14) illustrate that skills, as an art of

doing, are distinctive concept from the technical photographic knowledge (i.e. the talent cannot be learned in photography books and camera manuals).

Equipment performance

Photographic equipment was recognised as one of the central resources or enablers of capturing photographs. When referring to equipment participants were generally referring to what the equipment enabled.

X8 as an advanced user speaks about the performance of both the camera body and the lens. In combination, these two enabled him to take very sharp photographs in low-light environments without using a tripod. In this case X8 was able to create the night photographs the same way a human eye sees it.

> *"…I've got a camera that can shoot very fast burst rates which I need sometimes when I'm doing live events for things. I can shoot about 8 frames a second and have very low shutter lag as well and the lens can also perform well under the low light hand held."* **X8**

X16 attributes the quality of picture to the performance of the equipment, in this particular case the sharp lens that gave good detail in the photographs.

> *"…the lenses being sharp help in the quality of the picture…"* **X16**

Olaru et al. (2008) and Sandstrom et al. (2008) see equipment as technical enablers of service, while Vargo and Lusch (2004a) argue that products are carrier of capabilities/competences and vehicle of service delivery enabling an intended activity only when used (Fischer et al., 2010). Consistent with the literature, the data offers numerous examples/illustrations to support the importance of operant resources embodied in the equipment in terms of what the equipment could do and how good its performance was. The given quotes highlight the importance of the product performance for value-in-use creation.

Contextual resources

Contextual resources have been extensively acknowledged in SDL/SL conceptual/theoretical publications (see Vargo, 2008, 2009; Helkkula et al., 2012; Edvardsson et al., 2011; Heinonen, 2004; Pihlström and Brush, 2008; Pura, 2005). Vargo et al. (2010) and Ng and Smith (2012) argue that resources such as time and weather, which are considered exogenous and uncontrollable by individuals and organisations, are often integrated and relied on in the value creation. However, as an apparent resource (Chandler and Vargo, 2011) or resource constellation (Edvardsson et al., 2012) input into value creation was largely ignored. In this study, however, it was shown that customers do recognise the context as an essential resource employed and relied on it in the course of taking photographs. The following quotes illustrate this inference.

X21 describes one of these unique arrangements of nature that have triggered his camera usage.

> *"…I saw a fantastic rainbow… and took a photograph of it on my… iPhone so it's got decent mega pixels but by the time I'd stopped the rainbow had all but gone but it was amazing because it was only a portion of the rainbow and the sky was immensely black and it was framed by bright green foliage and there was this section of rainbow, an arc that disappeared beyond into the black at both ends and it was just a different rainbow than I'd ever seen in my life before… so it's something that I really enjoy..."* **X21**

X16 explains the vital role of light as an input resource in camera usage.

> *"Light is, I mean light is the main thing in an image… Yeah if there's no light, there's no picture. But if there's too much light again, again there's no picture."* **X16**

The findings have shown that contextual resources such as light, scenery and ambiance play a vital role in value creation in the context of camera usage. Contextual resources are operand resources arranged by nature that also frame and impact usage experience (Braiterman and Saivo, 2007; Gummerus and Pihlstrom, 2011) and should be explored in

studies that are focusing on value creation where the context can have significant impact on value created such as in the domain of photography, but also in the domains of such are travelling and leisure. Furthermore, contextual resources sometimes provide unique or rare events that, when captured as photographs, are valuable *per se*. These contextual resources require the camera user to adjust all other non-contextual resources so that a successful photograph can be created, highlighting their integral, combinative importance.

Contribution of participating actors

Actors other than the customer can be optionally present in the process of camera usage. In that case, the value creation process takes on the form of value co-creation (Grönroos, 2011b). Other actors (such as supplier, peers, customers etc.) contribute in value co-creation with their resources such as with knowledge, skills, competences, procedures, facilities (Olaru et al., 2008; Vargo et al., 2008) or even by their mere presence.

X17 and X18, as professional photographers, speak about engagement between photographer and subject. This encompasses understanding, co-operation and exchange in a common endeavour to get successful photographs. They argue that engagement makes the difference, and contributes to the success of a photograph.

> *"…for photography to work they [the subjects] have to engage with me and this is just a way of recording the moment… I have to engage with the person, they have to engage with me and I have to have the technical skills to capture that particular picture… With a portrait it would be an engagement with me… If I haven't got that look or that smile, if there's any hint of nervousness in them, it shows and I'm failing…"* **X17**

> *"…we'd got this, this relationship, this, this view that, I wasn't going to make them [a wedding couple] look almost stupid, I was quite prepared to be, to work with them because they didn't want something the same as everyone else and I was quite happy to do something slightly different. "* **X18**

The contribution of participating actors not always increases but can also reduce the co-created value. X9 gave an example of people who spoil photographs.

> *"…I found it quite hard as a young woman in Sierra Leone to take photographs, unnoticed. So if I have the camera there'd be loads of young guys suddenly posing in front of me and that's not the kind of images we wanted… we want natural shots of people working or with their kids and stuff…"* **X9**

The quotes of X17 and X18 illustrate how important participating actors are for the process of value co-creation in this context. The contribution of a participating actor encompasses co-operation and engagement (Arnould et al., 2006) with the subjects to create a successful photograph. Sometimes the participants can take a more passive role, following the directions of the photographers; while in a more proactive role a participant can give advice and even educate the camera user (see the quote from X3 in Section 4.5.2.1). In case of X9, the 'contribution' of participating actors results in something that Plé and Cáceres (2010) and Echeverri and Skålén (2011) call value co-destruction. Clearly participating actors can, for better or worse, influence the value creation process, with an involvement from other actors clearly making the experience from value creation to value co-creation. This fits with earlier discussions about the need to differentiate between the two but distinct processes (see Grönroos, 2011b).

The following section provides lenses for classifying actors in value creation.

4.5.3. Actors in value creation

Consistent with the resource classification according to the type of access (see Section 4.5.2.1), all actors can be broadly distinguished as being in one of two groups:

- ***ACTORS DRIVEN BY PROFIT.*** They offer their resources through market exchange and they ultimately engage in market exchange in order to gain profit. In this particular research context a number of actors driven by profits are identified such as: photographic equipment manufacturers/retailers, professional photographers, software suppliers, providers of photographic courses, photographic magazines etc.

- ***ACTORS WHO ARE NOT DRIVEN BY PROFIT.*** Driven by various motivations, they offer and share resources for free. In this particular context these are mostly other customers (or customer communities) who find it rewarding to share their knowledge and skills, be it online or offline, friends and family of customers who share (or give as a gift) different resources (mostly equipment) as part of confirming relationships with customers etc. In some circumstances (promotion) actors who are driven by profits can also offer resources or give access to resources for free (free samples and free trials). However, the agenda behind this is revenue generation.

Given that this classification of actors stems from the classification of resources according to the type of access the quotes were unnecessary. The next section provides insights into the way customers see their roles in the value creation process and how they understand their influence on the outcome of the value creation process.

4.5.4. Customers' perception of their role in value creation

Putting aside the way scholars and practitioners perceive and label the roles of actors/customer in value creation, it was also interesting to explore how customers perceive themselves with regard to their roles in the value creation process as this perception could probably have implications on value creation behaviour.

Customer X4 argues that the outcome of taking a photograph is a matter of luck. While pointing with a finger to her head, X4 said she captured only a "*picture that's already there*". She did not give herself credit for recognising that she herself had chosen to take a photograph of that particular scene, who set the equipment ready and taken that photograph. As can be seen from the quote, X4 considers herself to be a recipient of value awarding herself a passive role.

> ***"…****I think I have some nice pictures but I don't think that necessarily has anything to do with me because I just think, if I'm on the beach at Coco Reef Hotel and there's a gorgeous sunset over the water, that has nothing to do with me, I just sort of take the picture that's already there ..."* **X4**

X2 is slightly more critical when asked to elaborate on what or who determines the outcome of the value creation process. She argues that when the camera is working in auto-mode (meaning the camera is auto-adjusted) then the outcome is attributable to the equipment (in this case X2 is a value recipient), whereas when user adjusts the camera manually then the outcome is due to the customer (in this case X2 is a value co-creator). She took a few photographs with her sister's camera and this is how she explains what was behind the outcome.

> ***"…****I tend to attribute it [a good photograph] more to the camera and how great her camera is rather than my skill [smiles]. Her camera has this nice auto focus thing so you can alter whether you want the background to be blurred or in focus with everything else so I do attribute it a lot more to the camera because it's automatic whereas if it was, say, a digital SLR that was manual and I'd be doing it myself then I would probably be more critical of myself in terms of how things turn out."* **X2**

Unlike other informants in this section, X16 is a professional photographer, and as such he appears to be very critical of his role in taking photographs. He considers himself to be ultimately responsible for the way pictures turn out (he perceives himself as a value creator).

> ***"****…I always shoot in the studio on manual so I set everything there is to set on the camera and I also set all of the studio lighting so if the picture's bad I can't actually blame the camera, it's me that… told it what to do… its only my error nobody else's… I've told the camera what to do, if the picture's bad it's down to me."* **X16**

The findings show that customers see their roles in value creation along continuum – some would say to be value recipients, some to be value co-creators, while some to be the absolute value creators. These empirical findings are especially interesting when compared to SDL's uniform understanding of all customers as value co-creators (see FP6 in Vargo and Lusch, 2008a) or SL's dichotomous view on customers as either value creators or value co-creators (Grönroos and Gummerus, 2014; Grönroos, 2011b). Despite the fact that both SDL and SL advocate the customer-centric understanding of marketing phenomena, the empirical evidence shows that customers understand their value creation roles differently from what is

postulated by SDL/SL theory. It is still not explored if and how customer's value creation role perception or value creation awareness influences value creation. However, further quantitative studies in this doctoral thesis explore this issue.

4.5.5. Value creation process

So far this chapter has explained that the inputs into the value creation process form a dynamic structure *customer-resources-actors*. As regards the structure of the value creation process, the data suggests that it consists of 5 phases:

1. ***USAGE EPISODE INITIATION*** is the beginning of the value creation process. The output of this phase is a specific ***GOAL*** of consumption/usage.
2. The next phase is ***RESOURCE SELECTION***, where a resource set that will be used for service creation is chosen from the pool of resources and physically included in the process. The output of this phase is a ***RESOURCE SET***.
3. The resource set is then subject to the ***RESOURCE ADJUSTMENT***, where resources included in value creation are operationally, physically, spatially and temporally adjusted to work together. The output of this phase is an ***ADJUSTED RESOURCE SET***.
4. The adjusted resource set is subject to a ***RESOURCE INTEGRATION*** phase, where adjusted resources are applied or integrated into the ***SERVICE***, with the service being defined as the outcome of the service creation process, including ***SIDE-EFFECTS***.
5. All the outputs of the service creation process (processes 1–4, both individually and together) are subject to an ***EVALUATION*** phase, whereby episodic value-in-use is determined by customer. The output of the evaluation phase and, finally, the whole value creation process is ***VALUE-IN-USE***.

Stages 1–4 comprise the ***SERVICE CREATION PROCESS*** or the usage/consumption episode. Stages 1–5 constitute the ***VALUE CREATION PROCESS***. Therefore, in the model suggested here, the value creation process consists of the service creation process, plus the evaluation of the outputs of the service creation process. What is also clear from the data, and consistent with the extant literature, is that the processes of service and value creation can be recurrent (non-linear), in that a customer can revisit earlier phases (see for example Aarikka-Stenroos and Jaakkola, 2012).

The following sections explain the above phases of value creation and each phase is illustrated with empirical findings.

4.5.6. Usage episode initiation and usage goal

Before going out on the street, X12 has a broad agenda (goal) to capture "*something that fell out of the pattern".* He takes his equipment and seeks a shooting opportunity. This usage episode is initiated by the customer himself, but the rest of the service and value creation process depends partially on external factors.

> ***"****I like life photography, life has prepared amazing things around us. When you walk around you don't know what will come up on the next corner. I love catching that moment. I am always looking for something that fell out of the pattern that we are used to. It could be anything, nature, people, objects, animals. But it needs to be special, something that grabs you strongly, so you cannot take your eyes from the photo. It must have effect on people, it must move people. Must say some story."* **X12**

Here, the usage episode was initiated by other actors. This means that the goal of value creation can be negotiated and co-created with other actors. This is also highlighted by **X1** who usually does portraits of his friends because they ask him to (i.e. they initiate his camera usage). The quote also shows that photography as an outcome of the service creation process can be input in a new value creation process (i.e. post-processing).

> ***"****I do [portraits]... Mostly because my friends ask me to do that and I find it really interesting later to Photoshop and retouch them."* **X1**

Special events like a wedding or a natural event may also initiate a usage episode. In these cases customers, being aware of the uniqueness of the event, decide to take a camera and record the event in order to save it from loss. This is also an illustration of an episodic goal.

> ***"…****if I was going to a wedding I would automatically take my camera, without doubt,*

because for me it's something that I have to do. I have to remember the time via pictures." **X25**

The empirical data provided by quotes in this section points to the first stage of value creation – the usage episode initiation. Initiation is the moment when the customer, triggered internally or externally, progresses into actual consumption and starts a consumption episode. The episodic nature of value creation was previously elaborated by number of scholars (Roggeveen et al., 2012; Verhoef et al., 2009).The outcome of the initiation process is a goal or agenda for the particular consumption/usage episode (Lemke et al., 2011; Epp and Price, 2011; Grönroos and Voima, 2013; Gummerus and Pihlström, 2011; Piacentini et al., 2013). The quotes below illustrate existence of episodic goal:

"…I have some picture in my head*, before I take a photo, and I try to do that with a camera and if I am satisfied, I keep it and if I am not, I take another one, or two or five and I do some Photoshop work later, like shadows, highlights and stuff like that."* **X1**

"[I enjoy] being able to create something, being able to sort of ***take that one picture that sort of sticks in your mind****, yeah it's really good."* **X16**

*"…****the kind of pictures I take are already in my head*** *and I see a situation I know where I've got to be…"* **X17**

Once the goal is established, a customer has certain expectations with regard to the experience or the outcome of the usage episode. In other words, consumption (i.e. value creation) is a goal driven activity (Gummerus and Pihlström, 2011; Payne et al., 2008), where goals can be abstract or specific (Lemke et al., 2011), individual, relational or collective (Epp and Price, 2011). The photographs are in this case a means to reach desirable end states – the goals (Gummerus and Pihlström, 2011). Thus, as shown by both literature and empirical data, the goal is integral to value creation process.

4.5.7. Resource selection

X2 had a goal to create a special type of photograph called light graffiti for her school project. To this process she brought her knowledge of light graffiti (she explained how a camera has to be adjusted and what resources were needed to achieve the light graffiti effect), a torch, a digital camera and a tripod.

> *"Another project I did was with [a] digital camera doing light photography and what they call now light graffiti where you put the camera on a long exposure and you write words with a torch or something and again my teacher was fascinated by that."* **X2**

X26 is into macro photography – the pictures where fine details of small things are captured. She explains that different kinds of photographs require different resource sets. In the case of macro photography she explains what is included in a resource set – camera, macro lens, macro flash, the light tent, the subject of the photo, remote controller, tripod and tripod heads and obviously knowledge and skills on this particular topic. However, the emphasis is on creating adequate resource sets that will consist of compatible and mutually matching resources. The resource set also has to match the consumption goal and the demands of the context, sharing the importance of the context as a resource in some value creation situations.

> *"…The light tent also was a gift because I like taking pictures of small things and it's really difficult with lighting to get it right and you either need a few flashes around it to evenly light it and the background also it makes a nice background so that's a reason for that really. Tripod you do need a tripod, I don't know I think they are just essential things…depends on what you want to do. Especially maybe more night shots or if you take a picture of your own family and you're standing in front of it, it would be good to have it on a tripod. You also have remote controls for the shutters, that's it."* **X26**

Once the consumption episode is started, the data has shown that customer is then seen to select resources by themselves or though interactions with another actor(s). In doing so customers can either use those resources that they own or have free access to, or draw on ones they are in a position to buy or rent (Vargo and Lusch, 2011; Hibbert et al., 2012). The

empirical findings of this section fits with Payne et al. (2008) model of value co-creation which recognises customer's decision making that explicitly entails resource selection. Furthermore, Liu and Cai (2010) propose that value creation includes resource identifying and obtaining (in some cases through purchase). Aarikka-Stenroos and Jaakkola (2012) also argue that prior to resource integration the customers identify (recognise), activate (use) and collect (select/include) resources. A resource represents a carrier of capabilities, enabling an intended activity only when used (Fischer et al., 2010). Thus, resources may not only become, but conversely can cease to act as resources when they are no longer utilised in value creation (Löbler, 2013; Peters et al., 2014). This actually implies that it is the resource selection phase in which potential resources actually gain a property of being a resources (after they have been recognised and included in value creation process as a resource). Base on the identified literature and empirical evidence it is concluded that resource selection is a key phase in the value creation process that results in a selected resource set (see resources sets mentioned in the quotes of X2 and X26).

4.5.7.1. Value-in-exchange emerging from the resource selection phase

X29, as a professional photographer, buys equipment as per the requirements of his work. For him, value creation episode has started once the job is accepted and X29 has a clear goal. When X29 does not have the right equipment for a particular task, in the phase of selecting resources he completes purchases.

> *"Whenever someone gives me a job which is different from what I normally do I tend to go on the internet and basically research what the best equipment is for it. Ok. And if I haven't got a lens… that I need…for that event, I will buy it..."* **X29**

X10 had first established a clear goal – to record his crossing of the Sahara – which implies that his value creation process had already started. In the resource selection phase he realised that he did not have a proper camera, which drove him to buy one.

> *"I bought my first Cannon camera in 1986 prior to my crossing the Sahara so that I had a good camera to record that crossing…"* **X10**

In certain cases, as shown above, a customer can start a consumption episode and then realise that they need an additional resource (piece of equipment, software, a service etc.) that must be accessed through purchase. In this case, at this point, a value-in-exchange can also emerge in the resource selection phase. This is important given that it enables illustration of how fundamentally different are value-in-exchange and value-in-use, not only in what they represent as theoretical concepts, but also in terms of distinctive phases in value creation in which these two can emerge. As shown value-in-exchange can emerge in resource selection phase, while value-in-use emerges following service evaluation phase (see Section 4.5.10).

4.5.8. Resource adjustment

An issue that has not been explicitly mentioned in the literature but evident in the data is resource adjustment resource. It is clear here that set is often subject to a process of resource adjustment or preparation for the resource integration process. Certain resources can be operationally adjusted to perform different tasks or behave in a certain way in order to serve a certain purpose (goal) in a given context. Some resources can be physically manipulated and modified (for example putting a camera into a certain position, bending an external flash gun to a certain angle etc.). Participating actors can be instructed to pose or do certain activity so that a desired effect is created. Resources are also frequently selected and adjusted to compensate for some missing resources.

Resources can be adjusted by customers and/or actors participating in the consumption process, while some operant resources can be self-adjusted or can adjust other resources. (For example, some cameras have the ability to autofocus, some smart phones have ability to automatically adjust screen brightness and contrast according to the daylight, some cars can auto adjust height to achieve better air resistance and faster speed etc.). The output of the resource adjustment process is an adjusted set of resources that is to be integrated into service.

In the following example, X18 explains how resource adjustment is crucial to service creation. He emphasises how important it is for a user to have proper knowledge of how to adjust a camera (the informant uses the word '*manage*'). In this case the camera is adjusted to serve

a particular purpose. It is about taking a close shot of a product, where the sharpness of the photo is of the highest importance.

> *"…you've got white balance to take into account, you've got lots and lots of other settings but at the end of the day all that matters is you've got the triangle of your shutter speed, your aperture and your ISO and if you can manage those three things then that [is] 90% of taking that photograph."* **X18**

Aside from the operational adjustment shown in the previous example, resources can also be physically and spatially manipulated. X8 points out how panning a camera (or moving the camera to follow a fast-moving object) is important in order to convey the effect of movement of the focal object.

> *"I was at a boat race recently and I was doing some slow pans where I was just following [the] motion of the boat very slowly and sort of you find motion, you can, that's what you see a lot of top sports photographers do in order to convey a feeling of speed and feeling of excitement."* **X8**

Each resource in the resource set can be adjusted in such a way as to match the usage goal, to match other resources in the set, to match the context requirements and/or to compensate for a missing resource. For example, X27 explains how resources can be adjusted when a user does not have proper lightning (an example of an inadequate/missing resource). Basically, the following illustration shows how spatial manipulation of resources against daylight compensates for not having an artificial source of light – flashguns and reflectors – i.e. compensating for missing resources.

> *"…if you're taking a photo outside, you haven't got artificial lighting, you haven't got reflectors, you haven't got all that equipment. You know, waiting for the right time of day, the right kind of daylight; orienting the subject in the right way… you could take the photo of them in the right position, encourage… if it's a person, if it's a model, encouraging them to strike the right poses, catching them in the right poses. If it's a landscape, waiting until the clouds aren't in front of the sun or what, or depending on*

what look you want, if you do want a cloudy look then wait until they're in front of the sun. I think a lot of it is to do with timing, light, experience, and composition." **X27**

Some users, like X4 and X8, prefer the equipment to auto-adjust. In the case of X4, auto-adjustment is a more convenient form of usage, whilst in the case of X8 he argues that auto-adjustments (auto-focus) give him better results than manual focusing. In both cases it can also be argued that the equipment is compensating for the inadequate resources (knowledge and skills) of the customer.

"…*I like the idea of auto zoom and focus as well because I don't have to fiddle with it. The less I have to mess around with it the better…"* **X4**

"[auto-focus] makes it much easier for me to get a shot… I mean I can use the auto focus system rather than have to do it manually… the auto focus system is designed pretty well to match my needs as a photographer." **X8**

While not directly discussed, the existing literature using different labels also recognises a process that involves manipulation of resources but not as part of resource integration. For example, Vargo (2008) mentions *uniquely configured resources* that are applied in resource integration. Moeller's (2008) distinguishes between *resource combination* and *resource integration*. Similar to arguments made by Aarikka-Stenroos and Jaakkola's (2012) about organising resources and processes, Cova and Salle (2008) speak of *resource customisation* before resource integration. Finally, Payne et al. (2008) speak of *resource preparation*. Thus, literature recognises that resources can be configured, customised, combined, arranged and manipulated without being integrated into final effect (service). What is clear from the literature and the qualitative data is that there is an activity that involves the manipulation/arrangement of resources that precedes resource integration, confirming that resource integration should not be regarded as the value creation itself. Resources have to be shaped and adjusted to be able to be integrated with each other. The finding shows that this phase can be seen as a phase preceding resource integration in a way that creates value for the customers.

4.5.8.1. Revisiting previous value creation phases from the resource adjustment phase

As highlighted above, in some cases, when resources cannot be adjusted, a customer may regress or return to or revisit previous phases in order to rectify the discrepancy in what the current resources can achieve.

For examples, X18, a professional photographer, outlines that during the phase of adjustment, he regularly goes back to resource selection to add or drop certain objects from his frame.

> *"…I did a shoot recently for some food photography and it was really boring because it was all white background stuff and I took the food out for a walk and found somewhere different to photograph this food… on a wedding… I'll take the [wedding] shoes for a walk for instance, you know, I'll take the jewellery out I'll take wherever… it's creation of something that is not just photographs it's the memory."* **X18**

X18 clearly tries experimenting with the content of the picture in order to create a diverse range of photographs within one usage episode. This requires revisiting the resource selection phases and usage of an altered resource set.

4.5.9. Resource integration

Simon et al. (2007) argue that resource integration is a process in which resources are deployed and shaped into capabilities. Vargo and Lusch (2010: 4) argue that "service provision implies the ongoing combination of resources, through integration, and their application". In line with Simon et al. (2007) and Vargo and Lusch (2010) view, here it is argued that resource integration is a distinct phase in the value creation process where the adjusted resource set is applied or turned into an outcome - a service, which can have tangible and/or intangible features. In this research context, the photograph is the service: the output of the resource integration phase and the service creation process.

Resource integration, in this research context, is an irreversible process because integrated resources that result in a service cannot be fully disassembled into the constituent resources. In this particular research context, resource integration occurs in the moment when the shutter button is pressed. This means that the adjusted resource set is applied and turned into a photograph (outcome). This moment is usually referred to (in the discourse of respondents) as 'shooting a picture', 'taking a picture', 'making a snapshot' etc. However, this is not always the end of the process, as the photograph created can then become an input resource to a new value creation process. However, this topic remains beyond the scope of this study.

4.5.9.1. Service as the output of resource integration

In this section a few examples will be provided to illustrate particular actions in the moment when resources are integrated. This provides the evidence that resources are applied for the creation of service (photographs).

X16 says that pressing the shutter button is the moment when all the previous steps taken will produce an effect. It is clear that it is important that the resources are well adjusted and that the picture is shot at the right moment.

> *"…If you click the button, press the shutter at the right moment, is the difference between a good picture and nothing… if you don't press the shutter at the right moment then there is no picture."* **X16**

X1 describes how shooting results in photographs that undergo a process of evaluation by the customer and other actors.

> *"… when I was in Canada and I was shooting everything… some of those photos were really great, not just for me but for some other people and I decided to buy another camera that it was somehow better than it was before and I decided to shoot."* **X1**

X18 explains the whole value creation process. He decided to take pictures of his daughter

playing and give them as a gift to someone (goal is created). Then he took his daughter to the park to take the pictures of her (resources are selected). The camera was set wide open (resources are adjusted). He shot several photographs (resources are integrated and service is created). He walked around and tried capturing photos from different angles (from resource integration the customer regresses to resource adjustment).

> *"…and I took her [his daughter] to a local park and that was the first time really **I shot**, if you like a lifestyle photograph, I had the camera wide open and it was on film and I took her to the local park and let her play and I walked round the edge taking photographs of her. We took it to the local Boots and had it printed in an hour and for me it was, "wow"."* **X18**

What is clear from the quote is that the output of this value creation process (a photograph) was taken for development (this means that film was input in the process of photographic development, and finally, the service (photograph) was subject to evaluation. The idea of service as an outcome of the service creation process is consistent with Peters et al. (2014) and Vargo and Lusch (2004a, 2004b) who define service as the application of specialised competences (knowledge and skills), through deeds, processes, and performances for the benefit of another entity or the entity itself. However, what is also clear is that to realise potential benefits and sacrifices, the service has to be a subject of cognitive and emotional evaluation by a customer (Sandström et al., 2008). As Grönroos and Gummerus (2014) argue usage/consumption involves resource integration, and goods or any other type of resources constitute the means to realise service. Thus, it is reasonable to believe based on the extant literature and the empirical findings, that resource integration is distinct from the outcome, service, which is then distinct from evaluation.

4.5.9.2. Revisiting previous value creation phases from the resource integration phase

At the end of one usage episode, the customer can also be seen to occasionally go back and establish a new goal. Every time a new goal is established a new usage episode starts. Thus, a customer could potentially have dozens of usage episodes, one after another. X29 had

particular theme he followed. However, each time he took a new photograph he created a new goal.

> *"I did a Nigerian birthday party… it was a lot of prayer and then dance and food but the one theme I did through the whole thing was I was capturing random pictures of… Nigerian head scarves, women have that head scarf which is… colourful but they are all done in different ways. So, all throughout this thingy, you always get randomly a dot of that head scarf… a very good close-up, almost like a macro shot of that which was that, that was the theme, which went through that picture."* **X29**

It is possible that once resources have been integrated, especially in the context of shooting a photograph, a user can go back to the resource selection phase and add more resources or change the resource set. This means that a customer can, especially if they are not satisfied with the first attempt, take the same photograph or try to reach the same goal using a different resource sets. X29 is switching between two cameras when shooting one picture with different focal lengths.

> *"Also, [having] multiple cameras is a major thing you get when you become more professional. The reason for that is you haven't got time to swap lenses. So, you tend to have a prime lens in one which can do all the portrait shots. And then a zoom lens in the other which can get you your different focal lengths."* **X29**

In the context of taking a photograph, a user can shoot a series of similar pictures using different settings. X13 after each shot goes back and changes the setting and repeats the shot. A reason for this is to prevent having an error, or to be able to select the best photograph from a set taken with a range of different adjustments.

> ***"****I like being able to alter the white balance more and whenever I'm taking, going to be taking a lot of pictures I take a few on each setting and then look at how they come out…"* **X13**

As it can be seen from the three quotes above, from the resource integration phase, a customer can potentially revisit or regress to the: (a) usage episode initiation phase and create a new goal (first quote from X29); (b) resource selection phase and select a new resource set (see the second quote from X29); and (c) resource adjustment phase and readjust resource to create a better optimized resource set. These revisits of the previous phases empirically confirm value creation as dynamic, cyclical and non-linear process.

4.5.10. Evaluation

The next value creation phase appears to be evaluation, where the outputs of the service creation process are the subject of evaluation. This is where customers become aware of what has come out of the service creation and resource integration process, which is judged in a 'quality' sense.

> *"…recently, I was getting very angry with my camera because… I've seen some pictures on Facebook, my friends they used to have Blackberries and then they take the picture on the mirror and this shows very well. And I tried doing it on my own mirror in my room and I was so disappointed… it [the picture] was not clear… it was not as bright and fine as theirs was."* **X3**

> "*I take a few [photographs] on each setting and then look at how they come out."* **X13**

> "*I took a couple of shots I went inside and, you know, I put, I uploaded the pictures on my computer and I looked at them and some of them were quite good.*" **X14**

> *"…for me, my camera is just a tool to get the most precious possession, which is the image… and, I get more excited when I take a picture and I go 'oh, look at that image and look at what it's [the camera] done'."* **X29**

Evaluation was implicitly (Kleinaltenkamp et al., 2012) and explicitly (Hilton and Hughes, 2013) acknowledged in the current SDL/SL literature. Heinonen et al. (2010) argue that value is only realised through consumption from the customer's point of view (Lusch, Vargo, and O'Brien, 2007). This means that before value is determined or assessed by the customer or

by any other beneficiary, it must be experienced otherwise; there is nothing to assess/evaluate (Grönroos and Voima, 2013). In this case here, the customer has to actually see the pictures so that service can be evaluated. In the quotes shown above customers first take pictures (complete service creation process) and then evaluate photographs, in a separate phase to understand and appreciate the created value. In the evaluation phase customers were seen to assess the service (photographs), the side-effects, the resources and the resource set used, the adjustment of the resource set, the roles of and interactions with any actors present in the process and the entire service creation process. The evaluation, in this consumption context follows service creation, and can happen at a different time from the moment of service creation. A customer can see on the display how the photograph 'turned out' at a stage that is temporally different from the moment of creating the photographs. Thus, evaluation and service creation do not have to happen simultaneously (see for example X13 and X14). As the outcome of the evaluation, a customer understands the value-in-use of the resources applied in the consumption/usage episode and becomes aware of the final output of the usage episode. Value is in the end the customer's judgement and their final understanding of what was experienced as a mix of benefits and sacrifices.

4.5.10.1. Revisiting previous value creation phases from the evaluation phase

As shown in some of the previous quotes, customers can decide to restart the whole service and value creation process based on the outcome of the actual consumption process. In the case of X12 an unsatisfactory outcome of an evaluation process inspired him to do everything again in order to achieve better results.

> "*In high school I started to be obsessed with great photos and I wanted to make great photos too. I started with Zenith. It was really [the photographs that came out] horrible, but I kept trying, over and over, I liked the whole process. Especially then when all was on film. Developing, chemicals…"* **X12**

In some cases, at the evaluation stage, a customer can realise that he/she did not have adequate resources for value creation. In the case of X16 it was evident that he did not come into the service creation process with sufficient knowledge to achieve his goal. After

evaluating a photograph he created, he realised what resources were missing and returned to the resource selection phase, where he used written instruction to get some additional knowledge and ideas about how things could be done.

> *"I bought one [digital SLR] to have a play with and then I sort of started looking at the pictures and what I'd taken and thinking actually I could do it better than that and that's what it sort of built from. "I could do better if I did this" and went back and looked at it again, started reading up on people's similar experiences and, and how they'd done it to get their picture that was nice and sharp yet mine was blurred and then you sort of go and do it again and it gets a bit better and it, I'm nearly there but, a bit more, you know, and you just build from that."* **X16**

After evaluating a photograph a customer can return to resource adjustment. In this case, X18 was changing the setting and his position in the room in order to create a better photograph.

> *"I look for the image first. If I see something on a wedding that I've not done already, portrait shot, I think "oh that's not done as well as I would like", I'll have a look at that shot, I'll look at the settings, where I was positioned just to see why, why, what happened and then try and refine it the next time."* **X18**

The data indicates that the customer can return from the evaluation phase to the: (a) usage initiation phase (see X12); (b) resource selection phase (see X16); and/or (c) resource adjustment phase (see X18). The output of the evaluation process is value-in-use.

The next section explains and illustrates value-in-use with empirical findings.

4.5.11. Value-in-use

After the service has been evaluated including the service creation practice and any side-effects of service creation, customers establish their value assessment. In the case of value-in-use, two focal points were distinguished in the data. One was the value-in-use of a particular resource-in-use (such as a piece of equipment) and the other was the value-in-use of the synergy of the entire portfolio of resources applied and integrated into service (value-in-use of a service). In this work the latter is the focus because the extant SDL/SL theory emphasises the importance of the resources (plural) and their integration into service. Based on an extensive literature review and specifically the Smith and Colgate's (2007) frameworks four broad dimensions or components of value were distinguished: *instrumental benefits*, *experiential benefits*, *symbolic benefits* and *sacrifice/costs*. While the inventory was used for 'a priori' codes, no other codes related to value (such as monetary gains typical for B2B context) were identified during the coding process, thus providing support for the validity and comprehensiveness of the Smith and Colgate (2007) value framework. These are now described and supported with data.

4.5.11.1. Instrumental benefits

Instrumental benefits include what is possible to achieve using a physical resource (Sandström et al., 2008) and can be defined as value is derived from effective task/problem fulfilment and satisfaction of customer's extrinsic requirements using a physical resource (Zhang, 2014; Childers et al., 2001) or as "the extent to which a service has desired characteristics, is useful, or performs a certain function" (Smith and Colgate, 2007: 10). In the context of photography these benefits are closely focused on the tangible aspects of a created digital photograph – it's technical and aesthetic features, the achievement of the predetermined goal. The following quotes provide clear support for the above explanation.

When referring to her photographs, X2 said they were good enough to be printed.

> *"[Photographs] come out in a way that you can print it off and you can put it on your wall."* **X2**

When asked about what makes a good photograph, X12 mentioned a mix of symbolic benefits ("the story that the photo tells") and instrumental benefits – both aesthetic and technical photographic features that he gained from it.

> *"For me the most important one is content, the story that the photo tells, and after that comes the visual parameters, compositions, colour, contrast and after that technical stuff, sharpness, size…"* **X12**

Similar to X12, X27 outlines a mix of aesthetic and technical features which provide instrumental benefits.

> *"…a technically good photo it would be good composition, good lighting, subject of the photo in focus… it's got to be interesting, your eye has got to be led across the picture in an interesting way."* **X27**

4.5.11.2. Experiential benefits

X1 points out the experiential benefits stemming from the activity of taking photographs:

> *"It [taking photographs] just fulfils me"* **X1**

X10 and X14 simultaneously talk about experiential benefits stemming from the photographs (as service) and from the activity of taking photographs (as experience). X10 and X25 point out the important aspect of photographs – keeping memories of a moment safe from loss. This was the aspect of the photographs that almost every informant mentioned.

> *"…photography is my favourite pastime, relaxation and somehow photography is an instance which drives me away from the computer, takes me to nature, takes me among people and satisfies me to memorise and record certain things…which were very important in my life"* **X10**

"I think a good photo is almost personal, it's something that captures a moment or an object or a person or a scene that means something to the person taking it. So, I think a good photo is something that is personally important" **X25**

"…it [taking photographs] gave me a thrill… and gave me satisfaction, you know, and I was happy with the outcome…" **X14**

Experiential benefits are defined as "the extent to which service creates appropriate experiences, feelings and emotions for the customer" (Smith and Colgate, 2007: 10). As argued by Ballantyne and Varey (2004) this also includes the value gained from being part of and experiencing the process of value creation which in these findings include the benefits drawn from the mere experience of taking a photograph. The above provided quotes are clear illustration to support and empirically confirm the existence and importance of the experiential component of value-in-use as argued by relevant theory.

4.5.11.3. Symbolic benefits

The data provided support for the existence of symbolic benefits as well. The following quotes provide exemplary illustrations.

"It [photography] is a way of expressing myself, way of communicating with the world, and capturing moments that are happening around me." **X12**

"…photography for me, it's sort of become a way of self-expression. I sometimes struggle with expressing myself in other ways so behind the camera is sort of like a way of giving me an opportunity to forge my own interpretation of the world around me pretty much." **X8**

"The photos are really, really important because the saying "a picture tells a thousand words" is so true especially when you're trying to explain a situation to people… If you can show a picture of a woman with a baby and tell a story it means so much more than just words." **X9**

In literature, symbolic or expressive benefits represent those benefits satisfying the customer's requirement for social recognition, esteem, fashion, aesthetics and sociability (Zhang, 2014; Williams and Soutar, 2009; Sigala, 2006; Hibbert et al., 2012). In other words it is "the extent to which customers attach or associate psychological meaning to a service" (Smith and Colgate, 2007: 10). Symbolic benefits look at the self-identity, personal meaning, self-expression, social and conditional meaning that are achieved through service (photographs) and service creation (the activity of taking photographs). As shown in the quotes, the photography serves the purpose of communication (see X12, X9) and self-expression (X8) and, thus, enables symbolic value.

4.5.11.4. Sacrifices

Sacrifices are concerned with the perceived economic, psychological, personal sacrifices and risk costs (Smith and Colgate, 2007). It has been suggested in this study that a customer has to endure or 'pay' sacrifices in the course of value creation. One of the main aims of exploring sacrifices/costs was to inform the definition of value in SDL/SL and understand whether sacrifice should be part of the definition of value-in-use. The following quotes provide evidence for the existence of sacrifice elements in the course of value creation.

X9 speaks of how difficult it was to get desired photographs in a foreign culture (Sierra Leone). It required a lot of patience, stamina, devotion and effort to capture photographs of the locals in their natural setting in a non-posed way. X9 finishes that she was glad to have captured the photographs and all in all she felt they were worthy of sacrifice.

> *"I think it was a really good experience [taking photographs in a foreign country] but* ***quite difficult*** *I think considering I'd never done it before and Sierra Leone is* ***a very extreme place to go and do it****, very different culture [smiles]. But I'm glad I went, it was an experience."* X9

X16 says that taking photographs of other people is not easy. It is a process that takes effort and many trials.

*"With photography I really… it engages me because of the challenges that come along with it and I like the way that I can express some of the thoughts and emotions that are in me and that are in other people and it's instant but **it [is] not easy**..."* **X16**

X3 illustrates her frustration with unsuccessful photography, which can be regarded as a form of an emotional or psychological sacrifice.

"…sometimes when I want to take a photograph I pose very well, I look very well and then in the end the photograph doesn't look good so… I just feel like shouting…" **X3**

X10 tells how troublesome it was to carry heavy photographic equipment. In this case this is a plain evidence of the physical sacrifice a camera user had to make to be able to achieve his photographic goals.

"I even had two different cameras, one for slides, one for black and white. And then it was really troublesome carrying some five or six kilos of equipment." **X10**

Echeverri and Skålén (2011) argue value creation does not necessarily have to result in value creation but can also in value destruction. In a more specific sense this would be the case when no benefits are created (see quote X3) or when sacrifices outweigh any benefits created. However, it can be concluded from these quotations that value-in-use is comprises a mix of different benefits and sacrifices, and that SDL/SL definitions of value should include 'give elements' of value. The next section explains how value creation results in the learning of new knowledge and skills.

4.5.12. Episodic learning

The following quotes clearly illustrate episodic learning because they demonstrated new knowledge, skill and/or usage/consumption understanding that customers have obtained through a camera usage episode.

"…we went out we shot anything from people to car rallies to landscape, anything we could shoot we shot, we went to the dark room, we developed the film and we printed and then we looked at what we'd done, "ok that one didn't quite work, why?" And we went out and we shot, came back developed, printed so ***we learned through that*** *cycle."* **X18**

"…I did one thing on my camera, reduce the exposure on the flash, taking it down one stop and that changed my images considerably because I didn't have that over-exposed and because of that it just completely… it changed my style to the point where I had a setting, when I started the club I had a setting which I was… rather than going in rogue. I had a setting of where I knew I was going to use [f]5.6 and I might change it accordingly but I had a basic setting and I think that was a big milestone for me because that meant ***I understood what those settings did and what they related to what the image came out with****."* **X29**

Through each of the usage episodes the customer learns or at least develops incremental experience, which increases his/her operant base (knowledge and skills). This learning process, which goes on in the background of value creation process, is here named *episodic learning*. The outputs of this process are new or augmented customer knowledge and skills. The customer proceeds to the next usage episode with more experience, knowledge and skills, which implies the constant improvement of the practice of value creation. Accumulated episodic knowledge and skills can, over the time, alter customer expectations, wants, goals and value assessment approach with regard to camera usage. These might be one of the few important reasons why value has a dynamic nature. Empirical support for episodic customer learning has also its counterpart in the SDL/SL literature. Namely, Payne et al. (2008) argue that value creation involves customer learning that happens simultaneously with the process of value co-creation, whilst Argyris and Schön (1978) argue about learning through reflection on consumption processes. Hibbert et al. (2012) showed that customer's learning build customer's capacity to become an effective resource integrator. This new knowledge naturally affects future value creation processes and customer behaviour with regards to the value creation practices and resource employment in a way that customers generally become more efficient value creators with the growth of their knowledge and skills base.

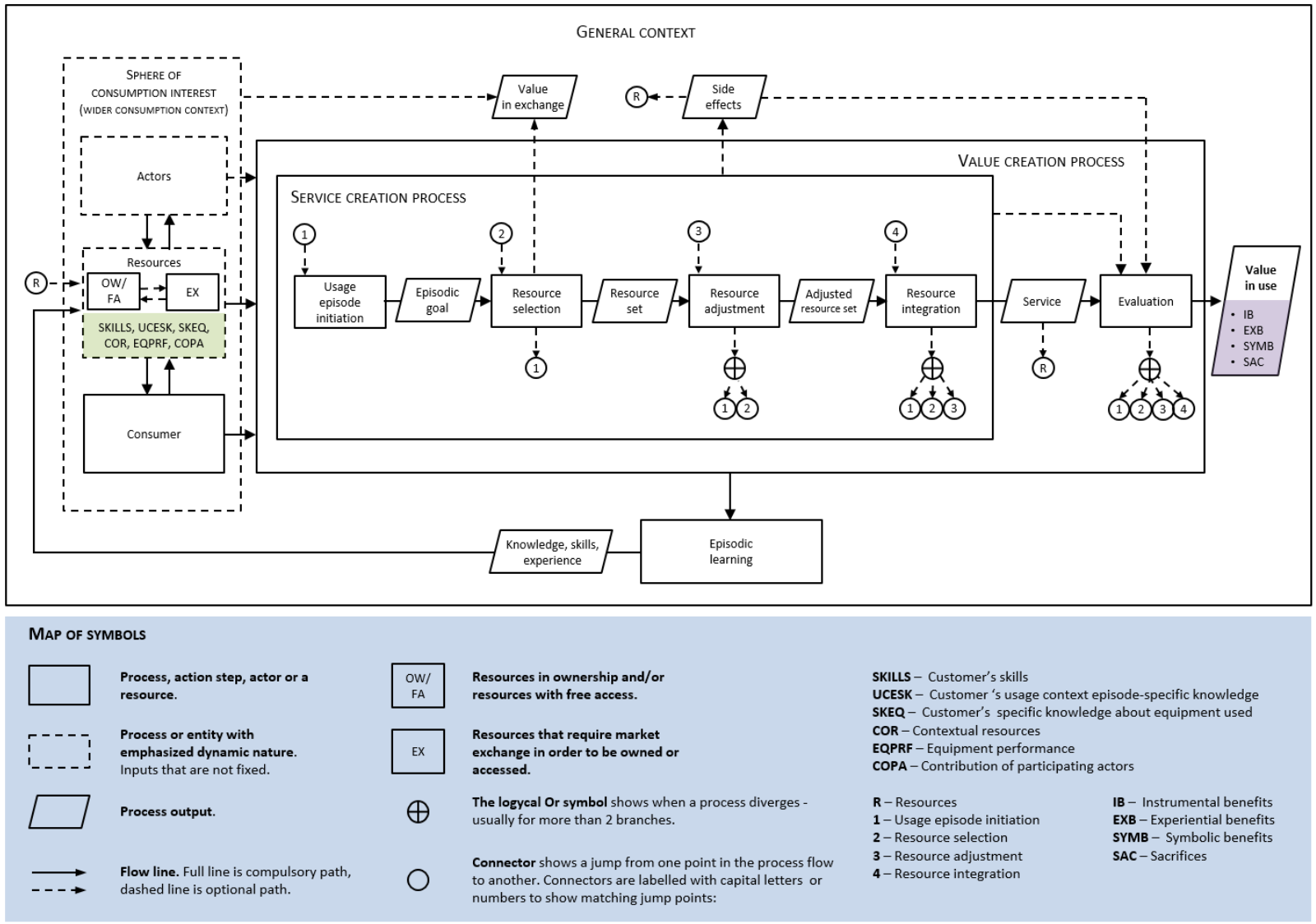
A summary of the findings from the qualitative/exploratory research phase, followed by the model of the anatomy of value creation, is given in the next section. These qualitative findings are tested in Chapters 5 and 6 (quantitative/confirmatory research phase).

4.6. Conclusions for the qualitative study (Study 1)

Study 1 was an attempt to understand the key research problems/gaps by bringing together the literature addressing extant knowledge about value creation with new empirical findings in order to build a conceptual model that would be able to simultaneously present value creation and value co-creation from the customer's perspective. The locus of the study was on customer's value creation practices (i.e. camera usage) and the customer controlled usage sphere (as urged by Grönroos and Gummerus, 2014; Vargo and Lusch, 2012; Heinonen et al., 2010; Sandström et al., 2008; Arnould et al., 2006; Payne et al., 2008). In this sphere other actors may only be optionally present (Grönroos, 2011b). Value creation was observed in the form of usage episodes. This approach was aligned with Roggeveen et al. (2012), Verhoef et al. (2009) and Kleinaltenkamp et al.'s (2012) views on value as an episodic phenomenon. Thus, studying value in episodes offers a sound approach given that "each [value creation] instance takes place in a different context, involving the availability, integration, and use of a different combination of resources" (Vargo and Lusch, 2012: 2). In this particular case, explaining the model through usage episodes enabled antecedents and consequences of value creation to be identified and explored. In this study usage of digital cameras was explored. Digital cameras, as well as a range of other technical products, can be used repeatedly (without destroying resources in usage) and can be regarded as a self-service technology which implies that the physical presence of other actors (i.e. suppliers) is not essential. This way both customer's independent value creation and value co-creation could be studied, depending on what actually happened in the customer's most recent camera usage episode. The findings based on 29 in-depth interviews will now be discussed.

The value creation process is not an all-encompassing, limitless phenomenon as argued by Vargo and Lusch (2012). The data has supported the view that the process of value creation has a beginning, an anatomy and an ends, it also has inputs and consequences. Before the value creation process is explained in more details, the broader context of the process, including inputs, will first be described as shown in Figure 3.

Figure 3: Model of the anatomy of value creation (value creation model)



For a value creation episode to occur, a customer has to have an interest in a particular consumption topic (i.e. taking photographs). From consumption interest sphere, a customer can (but not necessarily has to) progress to the actual consumption where resources are applied into a service. This means that in their interest sphere customers can undertake a number of activities (research, learning, sharing, buying, selling etc.) related to the consumption topic that do not include: (a) consumption or usage of the focal product; and/or (b) applying resources into service. An interest in a consumption topic can exist in a customer's life over a shorter or longer period of time, while the actual consumption can happen in one or more usage/consumption episodes. Customers and other relevant actors interact through and around resources (equipment, knowledge, skills, information etc.) that are important for service and value creation. This is aligned with the view by Håkansson et al. (2009) who see resources as foundations for the specific context of customer-supplier interactions whereas this study examines the wider range of customer-actor interactions.

This dynamic *customer-resources-actors* structure was found to be an input to the value creation process. Resources are the basis of interaction between individual actors in the value creation process (Håkansson et al., 2009), which is confirmed in this study. However, as demonstrated in this study, the *customer-resources-actors* input is clearly not fixed (Vargo and Lusch, 2012) and can be modified/altered during the course of the value creation process (by including, excluding or altering resources and/or actors). When it comes to resources this study distinguishes resources according to the access type as: (a) resources in ownership and/or free access; and (b) resources that require exchange to be owned or accessed. This classification is almost identical to the one proposed by Vargo and Lusch (2011) with customer-sourced and public-sources resources grouped into resources with ownership or with free access. On the other hand, the default operand/operant classification can be further classified according to the resource type to illustrate idiosyncrasies of the camera usage context. In this case these resources were identified as: customer's *usage context episode-specific knowledge* (Bettencourt et al., 2002; Hilton and Hughes, 2013), customer's *specific knowledge about the equipment used* (Maglio and Spohrer, 2008; Kleinaltenkamp et al., 2012; Sandström et al., 2008; Bettencourt et al., 2002), customer's *skills* (Vargo and Lusch, 2004a), *equipment performance* (Olaru et al., 2008; Sandström et al., 2008; Fischer et al., 2010), *contribution of participating actors* (Olaru et al., 2008; Vargo et al., 2008; Arnould et al., 2006) and *contextual resources* (Vargo, 2008, 2009; Helkkula et al.,

2012; Edvardsson et al., 2011; Heinonen, 2004; Pihlström and Brush, 2008; Pura, 2005; Vargo et al., 2010; Chandler and Vargo, 2011; Edvardsson et al., 2012).

The current literature describes value creation 'activities' (Vargo, 2008) with rather unclear and fragmented ideas about what these activities might be. However, this study has offered an understanding of the specific activities/phases involved and a more precise description of these phases. Consistent with the previous findings of Moeller (2008), Aarikka-Stenroos and Jaakkola (2012) and Payne et al. (2008) value creation is found to be a multistage process. The following five phases of value creation were identified in the Study 1: *usage episode initiation*, *resource selection*, *resource adjustment*, *resource integration* and *evaluation*. *Episodic learning* was not directly included in value creation given that this process happens between value creation episodes and generally informs subsequent activities of customer. Thus, it appears in the model but is excluded from the actual processes of service and value creation. The first four phases of value creation comprise the service creation process, the output of these is service which is then subject to evaluation.

Usage episode initiation is the moment when the customer progresses into actual consumption and starts the value creation episode. The episode can be triggered internally (by a customer) or externally (by actors, resources, events). The outcome of the initiation process is a goal, or agenda for the particular consumption/usage episode. In the light of this finding it is suggested that value creation is a goal driven process (Gummerus and Pihlström, 2011; Epp and Price, 2011). Once the goal is created and the consumption episode has started, the customer selects resources by themselves or though interactions/negotiations with another actor(s). This happens in a process called the resource selection phase where a customer decides which resources to employ (this process was also identified in studies by Liu and Cai, 2010; Payne et al., 2008; Aarikka-Stenroos and Jaakkola, 2012). In this phase value-in-exchange can emerge in cases when a customer has to purchase or rent the resources needed for use. The output of the resource selection phase is a resource set. The resource set then can be subject to a resource adjustment phase, which involves the manipulation, arrangement and/or modification of resources in the resource set. The resource adjustment process is performed not to create service but rather to optimise the resources for integration and make them suitable for the resource integration phase. Interestingly, previous literature recognises these activities under different labels – resource

combination (Moeller, 2008), resource organising (Aarikka-Stenroos and Jaakkola, 2012), resource customisation (Cova and Salle, 2008) or resource preparation (Payne et al., 2008). As shown, both the empirical findings and the literature recognise that resources can be configured, customised, combined, arranged and manipulated prior to being integrated into the final effect (service). Thus, the findings suggest that there is an activity that involves the manipulation and/or arrangement of resources that precedes resource integration. This is an important finding that suggests that resource integration is not the only phase of value creation in which operations on resources are being performed and that resource integration should not be regarded as the value creation process itself (see Hilton and Hughes, 2013; Kleinaltenkamp et al., 2012). The output of the resource adjustment phase is an adjusted resource set that is then subject to resource integration, where the resources are deployed to create a photograph (service). In this case, the resource integration is generally an irreversible process because the integrated resources that result in service cannot be fully separated into the constituent resources. In this particular research context, resource integration is the moment when the shutter button is pressed. However, unlike some of the more recent views (see Peters et al., 2014, Hibbert et al., 2012) the data suggest that resource integration does not necessarily directly result in value. These two (service and value) constructs are mediated by an evaluation phase, where a customer evaluates the service and also the eventual side-effects of the service creation process, the resource set used, the adjustment applied and the entire service creation process. Thus, only once everything was experienced, and cognitively and emotionally evaluated (Heinonen et al., 2010), can a customer realise value-in-use. In this particular context, resource integration results in photographs. However, given they are stored in the memory of a digital camera (or other storage devices), their evaluation does not necessarily have to be simultaneous with their creation, but can happen at a later stage. The current literature also recognises evaluation as an important process in value assessment (see Hilton and Hughes, 2013; Kleinaltenkamp et al., 2012; Lush et al., 2007; Grönroos and Voima, 2013; Helkkula and Kelleher 2010). Having in mind both empirical findings from this study and knowledge of this matter in the current literature it can be suggested that evaluation is the final process of value creation that results is value-in-use.

Value-in-use was confirmed to be multidimensional, consisting of: *instrumental benefits*, *symbolic benefits*, *experiential benefits* and *sacrifices*. This value inventory was found to be

consistent with Smith and Colgate' (2007) value operationalization. Instrumental benefits were identified as the benefits that are closely focused on the tangible aspects of a created digital photograph – the photographs' technical and aesthetic features. Experiential benefits included the benefits drawn from the experience of taking a photograph (fun, excitement, socialising etc.). Symbolic benefits showed how well the photographs supported customer's self-identity, offered personal meaning, supported self-expression, provided social and conditional meaning. This was seen to be especially important for the context of social networks, where photographs are instantly shared so that other customers can evaluate and comment. Interestingly, the sacrifice dimension of value was confirmed and this study supports the few other studies in SDL/SL that have empirically confirmed sacrifice as dimension of value-in-use (see Gummerus and Pihlström, 2011; Mohd-Any et al., 2014). Sacrifices includes customer's mental and physical efforts, opportunity costs, frustration, time and money spent. Finally, no other value dimensions were found such as monetary gains relevant for a B2B context - see Gronroos and Helle (2010).

Explaining value creation through episodes emphasises the dynamic nature of value (Voima et al., 2011a; Grönroos and Voima, 2013). Namely, after each usage episode, a customer is more knowledgeable and more experienced, thus having a better understanding the consumption process. This dynamic was captured through the process of episodic learning. This learning expands a customer's knowledge based and influences their subsequent value creation approach by making customers more effective (Hibbert et al., 2012). The knowledge, accumulated through usage episodes, is most likely one of the reasons why customers occasionally upgrade their equipment and alter their usage practices.

In opposition to Payne et al.'s (2008) view and consistent with Roggeveen et al. (2012) it was found that the value creation process in not linear, but rather cyclical and non-linear, showing how unpredictable and unique the value creation path of an individual customer can be. It was also found that customers can revisit any value creation phase identified in the model. Four out of 10 possible returns that are hypothesised in the model based on the literature had no empirical support in the qualitative findings, possibly due to relatively small sample and relatively high number of revisiting possibilities. These confirmed revisits were: (1) revisit from the resource selection phase to the initiation phase; (2) revisit from the resource adjustment phase to the initiation phase; (3) revisit from the resource adjustment

phase; and (4) revisit n from evaluation to resource integration. However, they were included in the model on the basis that there was a sound theoretical reason to believe them to be relevant.

To sum up, the findings from Study 1 represent a step forward into revealing the contents of the 'black box' of value creation and an integration of the somewhat fragmented pieces of knowledge available in the literature. The proposed model, along with the findings, provides insight for the literature gap on understanding value creation from the customer's perspective. Furthermore, this model allows for the simultaneous representation of both customer's independent value creation and value co-creation, given that the presence of suppliers (other actors) is only optional and not compulsory (see Grönroos, 2011). This way customers are given the primary role and they are in the focus of value creation. It was also shown that value-in-exchange can also emerge during the value creation process, and should not be ignored as advised by Grönroos and Gummerus (2014) who contain that value-in-exchange does not exist. It is also added that customers can switch between the value creation phases, in unlimited number of possible ways as defined by the model which outlines possible uniqueness of each individual value creation practice. Finally, not all customers see themselves as value creators. Some see themselves as value co-creators, some as passive value recipients. Their observation of their own roles or influence in value creation appears to partially depend on what or who else is included in the value creation process, or who adjusts the resources. How this affects value creation practices and the core model presented in Figure 3 will be explained in the subsequent quantitative studies.

Chapters 5 and 6 provide additional quantitative testing and verification of the model of value creation presented in this chapter.

5. Confirmatory research: Developing quantitative model of value creation

Based on the qualitative model of value creation (see Figure 3) it was decided to design a quantitative model and test it through a series of quantitative (confirmatory) studies. The purpose was to probe the qualitative findings with a larger sample for their potential confirmation/rejection. In this case, the qualitative research methods allowed a better understanding of the anatomy of the value creation process. The final product of the qualitative research phase was a rich and highly descriptive model of the anatomy of value creation. However, it was matter of question whether this model could "establish the relevance, significance and external validity for situations or people beyond immediate research" (Chalhoub-Deville, Chapelle and Duff, 2006: 67).

Provided that qualitative research generally employs small samples and heavily relies on researcher's subjective perceptions, the findings obtained this way are generally criticised as being incapable of generalisation and any such attempt could be at least considered risky (Gall, Borg and Gall, 1996). To compensate for these downsides, it was decided to challenge major parts of qualitative model through a series of confirmatory studies. This required: (a) translating/transforming the model into a quantitative model; (b) developing multi-item scales and indexes to measure the model elements (latent variables[18]); and (c) performing analyses on multiple representative samples of a satisfactory size.

The first challenge was to establish how the qualitative model should be translated into the quantitative model. Qualitative models are generally less formal and researchers can enjoy creative freedom in the way the model is presented and explained. This is not the case when it comes to quantitative/structural models due to the established formalism in defining,

[18] "Latent variables are phenomena of theoretical interest which cannot be directly observed and have to be assessed by manifest measures which are observable" (Diamantopoulos, Riefler and Roth, 2008: 1204). The indirect assessment of these constructs is accomplished via "paper-and-pencil" types of measures where multiple items or indicators are used to measure the construct (Bearden et al., 2011). A latent variable with multiple items/indicators can be either a scale (reflective construct) or an index (formative construct) (Hair et al., 2014). The difference is whether items define the construct (index) or construct defines the items (scale)

constructing, presenting and reporting a model (see Wright, 1934). A structural model is a set of hypotheses that explains how a group of latent constructs are related (see Figure 4, Table 42 and Table 57). To have a model that is testable against empirical data, the structural model requires measurement models (measurement theory) that serve as proxies in measuring latent variables. The combination of the structural model and measurement models allows the building of path models that finally enable the full testing of a theory (Hair et al., 2014). Therefore, two types of theories are required to develop and test a path model, and therefore test a theory of interest:

1. ***MEASUREMENT THEORY*** that specifies how the latent variables in the model are measured; and
2. ***STRUCTURAL THEORY*** that specifies how the latent variables in the model are related.

The circles in the structural model (see Figure 4) are latent (unobservable) variables/constructs. The arrows stand for relationships between latent variables. These relationships are formulated as hypotheses that are tested for confirmation/rejection. Confirming/rejecting these is a complex task that requires the application of structural equation modelling (Kline, 2011). Given the focus on a highly subjective reflection on experience, all of the concepts/phenomena (latent constructs) that are explored and measured in the quantitative models are perceptual[19], self-reported, and consistently with the focal phenomenon of the study, subjective in nature. Furthermore, given the complexity of the qualitative model of value creation, it was decided to test only parts of it while the proposed quantitative model focuses on a single consumption episode. Therefore, the quantitative model begins with the portfolio of resources selected and brought into usage and ends with created episodic value. The model also considers the transformation of resources into service and value and includes:

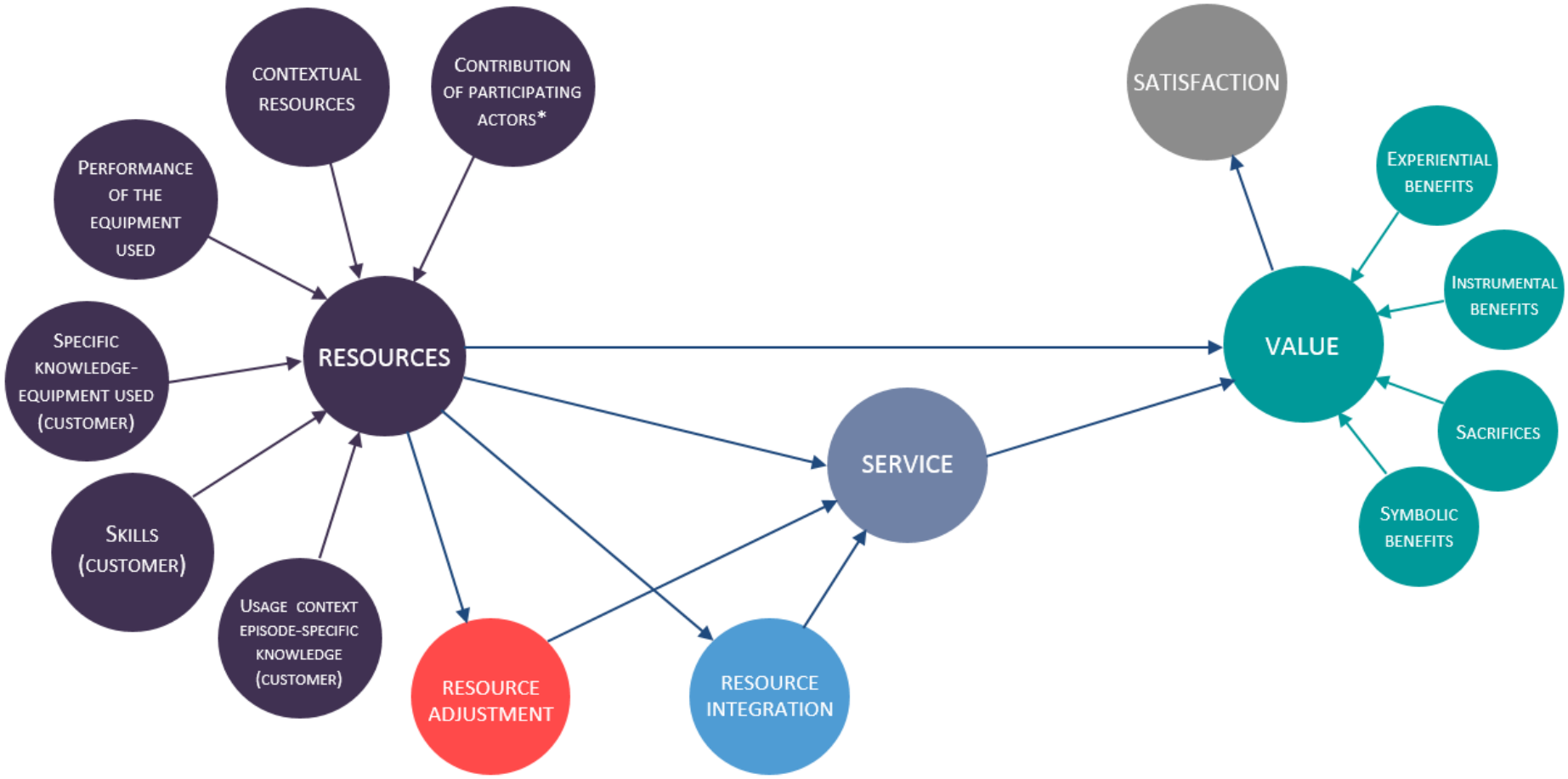
(a) the input resources
(b) the resource adjustment process;
(c) the resource integration process;
(d) the service; and
(e) value as the final outcome of value creation episode.

[19] Perception is defined as "an active mental process which involves the selection, organization, structuring and interpretation of information in order to make inferences and give meaning to the information." (Rollinson, 2005: 103)

This design was considered to be the optimal trade-off between model complexity and parsimony. Therefore, parts of the qualitative model, such as the complexities of activities outside actual value creation episodes, the mechanism of goal emergence, principles of resources selection, as well as the mechanism of episodic learning and evaluation are excluded from the quantitative study. These aspects of value creation are suggested as potential avenues for further research.

Figure 4 depicts two structural models depending on the presence or absence of actors other than the camera user (customer). This construct is marked with the asterisk. Therefore, the first model includes "Contribution of participating actors" as a part of the portfolio of resources employed in the usage episode. This model is called ***VALUE CO-CREATION*** given the customer's interaction with other physically present actors in the camera usage episode. If actors are absent, the model is simply termed the ***CUSTOMER'S INDEPENDENT VALUE CREATION***. The labelling of the structural models is aligned with the postulates of Grönroos (2009, 2011a, 2011b).

Figure 4: Quantitative/structural model of value creation



Note: * the actors other than customer do not necessarily need to be present in a camera usage episode. If actors are absent, the model represents *customer's independent value creation*. If actors are present, the model represents *value co-creation*.; RESOURCES and VALUE are higher order constructs. Their building components are coloured in the same colour

5.1. Developing, testing and confirming first order scales and indexes

For developing the scales the instructions and good practice suggested by a number of scholars, such as Bearden et al. (2011), DeVellis (2012) and Zaichowsky (1985) were followed. On the other hand, for the purpose of index development Diamantopoulos and Winklhofer (2001) guidelines and recommendations were used. As shown in Table 17, scale and index development and verification procedures do not follow the identical paths.

Table 17: Scale/index development process

DEVELOPMENT PHASE	SCALE	INDEX	SECTION
Definition of construct and its domain	1	1	5.1.1
Item generation	2	2	5.1.2.1
Expert assessment of scales/indexes	3	3	5.1.2.2
Exploratory factor analysis (EFA)	4	N/A	5.2
Confirmatory factor analysis (CFA)	5	N/A	5.3
Indicator collinearity	N/A	4	5.4.1
External validity	N/A	5	5.4.2

Note: numbers show phase sequence number, N/A – not applicable

The phases for scale/index development are briefly discussed. Each particular phase is elaborated in detail in the corresponding sections provided in Table 17. In phase 1, latent constructs and their domains were defined. In phase 2, for each of the latent variables a set of items was generated based on current theory and findings from the qualitative research. In phase 3, a panel of experts was used to assess if multi-item constructs have satisfactory face and content validity. Content and face validity reflect the extent to which a latent construct is translated into the operationalization of the construct (Bearden et al., 2011). Content validity concerns whether test items are representative of the domains they are supposed to measure (Kline, 2011) while face validity is the degree to which experts judge that the items are appropriately representing the targeted construct (Hardest and Bearden, 2004). The experts were allowed to give any suggestions that were help in establishing a sound measurement models. Thus, phase 3 also informed phase 2 in an iterative process until face and content validity was achieved. Phases 4 and 5 of scale development are EFA and CFA. EFA is a tool that explores latent factors that best account for the variation and

interrelationships of the manifest variables (Henson and Roberts, 2006). In this study EFA was used to statistically verify if the items were well assigned to the scales and if the scales had good reliability. Findings from the EFA were then used as inputs to the CFA that tested how well the hypothesised multi-item scales fitted a new sample. Unlike scales, indexes required their corresponding items to represent a set of heterogeneous elements that on an individual level define specific subdomains of the index, and on an aggregated level define the entire domain of the index. Phase 4 of the index development process tested collinearity of the formative indicators to identify and remove redundant items (items sharing a high degree of variance with other formative items), thus, leaving only a fairly heterogeneous set of formative indicators. Finally, phase 5 of the index development tested for the external validity of formative items.

5.1.1. Definitions of latent constructs

In this section, the latent constructs present in the model were defined to particularly suit the research context of camera usage and to generally comply with previously established theories/definitions. Each row in Table 18 starts with the construct name and construct label and provides construct's definition/explanation. Finally, each constructs was assigned a particular measurement model type (see superscript code in label column).

Table 18: Definitions of latent constructs

CONSTRUCT	LABEL	DEFINITION
Skills	SKILLS[a]	Photographic skills represent a customer's practical (hands-on) capability to take good photographs.
Usage context episode-specific knowledge	UCESK[a]	The construct represents a customer's photographic knowledge that is related to how well the customer was able to understand and recognise what was required for the most recent camera usage episode to produce a successful photograph.
Specific knowledge about equipment used	SKEQ[a]	The construct represents a customer's photographic knowledge that is related to how well the camera user knew about the photographic equipment employed in the most recent camera usage episode.
Contextual resources	COR[a]	The construct represents a customer's perception and assessment of the quality of photographic-relevant contextual conditions or parameters in the most recent camera usage episode.
Equipment performance	EQPRF[a]	The constructs represents a customer's assessment of how well the equipment performed in the most recent camera usage episode.
Contribution of participating actors	COPA[a]	The construct stands for customer's perception of how important and contributive was the presence of participating actors for the success of the most recent episode's photographs taken.
Resources	RES[c]	This higher order construct is defined as the customer's assessment of the quality of the entire portfolio of operand and operant resources employed in the process of taking photographs. Resources, in this research context, consist of SKILLS, UCESK, SKEQ, COR, EQPRF and COPA (if actors present).
	RESR[a]	This is first order reflective construct designed for the purpose of redundancy test for RES.
Resource adjustments	RESADJ[b]	The construct measures a customer's perception of the level of activities performed for the configuration of all the resources included in the most recent camera usage episode so that the set of employed resources performs better in the given context.
Resource integration	RESINT[a]	Resource integration represents application of resources (RES) for creating/capturing the photograph. The construct measures how successful were decisions on integrating resources in a particular way.
Service	SERV[b]	Service represents effects/outcome of the applied resources for the benefit of the customer. The construct is evaluation of how optimal was application of resources (RES) for capturing the photographs.
Notes:	a – first order reflective measure, scale b – first order formative measure, index c – second order formative measure, higher order construct, index (see Section 6.3.4)	

Table 18 (continued): Definitions of latent constructs

CONSTRUCT	LABEL	DEFINITION
Symbolic benefits	SYMB[a]	Symbolic benefits represent the self-identity, personal meaning and self-expression benefits gained from the most recently taken photographs.
Experiential benefits	EXB[a]	Experiential benefits represent the extent to which the most recent photographs created appropriate experiences, feelings and emotions for the customer.
Instrumental benefits	IB[a]	Instrumental benefits represent the extent to which the photographs have desired characteristics (quality, aesthetics etc.).
Sacrifices	SAC[a]	The sacrifices construct represents the level of economic, psychological and personal "investments" a customer had to make when taking the most recent photographs.
Value	VALUE [c]	Episodic value is a customer's experienced and (co-)created mix of benefits and sacrifices that are related to the (co-)created service. Based on Smith and Colgate (2007) value was defined as a higher order construct that consists of instrumental benefits (IB), symbolic benefits (SYMB), experiential benefits (EXB) and sacrifices (SAC). The construct is focused on value that results from an entire portfolio of resources applied into photographs.
	VALUER[a]	This is first order reflective construct designed for the purpose of redundancy test for VALUE.
Satisfaction	SAT[a]	This construct measures a customer's level of satisfaction with the photographs taken in the most recent camera usage episode.
Notes:	a – first order reflective measure, scale b – first order formative measure, index c – second order formative measure, higher order construct, index (see Section 6.3.4)	

5.1.2. Item generation and expert assessment of scales/indexes (Study 2)

This section explains how items used for building scales and indexes were generated and assessed, firstly by the panel of experts and secondly through EFA.

5.1.2.1. Item generation

As a guideline for item generation, the constructs' definitions and hypothesised measurement modes provided in Table 18 were followed. According to DeVellis (2012: 76) "each item can be thought of as a test, in its own right, of the strength of the latent variable. Therefore, the context of each item should primarily reflect the construct of interest. Multiple items will constitute a more reliable test than individual items, but each must still be sensitive to the true score of the latent variable." Therefore, utmost care was devoted to generating items that had the capability to be a sound proxy for its underlying latent phenomena. Faced with a challenging task of building a completely new set of measures within SDL/SL, all the available sources for item generation were used: starting with literature, but more reliance placed on generating items based on the qualitative findings and expert inputs. All of the initially generated items were written in the form of short positively worded attitudinal statements with 1 to 7 Likert-type equidistant response options. This exact 'spacing' between responses in a 1 to 7 Likert scale was a necessary requirement of the subsequent analyses. The odd range of responses gave respondents the possibility to take a neutral stance. On the other hand, 7 point responses allowed a good range of response variability, therefore providing the researcher the possibility to identify how strongly certain statements have or have not resonated with informants. Furthermore, when a Likert scale is perceived as symmetric and equidistant then it behaves more like an interval scale and the corresponding variables can be safely used in statistical analysis (Hair et al., 2014). Once the initial pool of items was ready, experts were approached for their evaluations. For the sake of conciseness, only the list of the final items with the sources from which they were generated is reported (see Tables 20 and 21).

5.1.2.2. Expert assessment of scales/indexes

Expert assessment is a vital part of the scale and index development process that helps establishing face and content validity of scales/indexes. Content validity concerns whether test items are representative of the domains they are supposed to measure (Kline, 2011) while face validity is the degree to which experts judge that the items of an assessment instrument are appropriate to the targeted construct and assessment objectives (Hardesty and Bearden, 2004).

There were three rounds of expert assessments with three panels of experts. In total, 10 experts (scholars) and two professional photographers participated. Following recommendations provided by Zaichowsky (1985) an instrument to record experts' assessments of face and content validity for each of the measurement models (scales and indexes) was developed. Figure 5 exhibits a generic page that shows the design of the expert interviewing instrument. Each page in the instrument started with the latent construct definition and proceeded with the specification of a latent construct measurement model (index or scale), the level of the latent construct in the model (first order or a higher order latent construct) etc. The list of attitudinal statements (items) were listed in the table and each item was evaluated as "clearly representative of the construct", "somewhat representative of the construct" and "not representative of the construct". Experts were also able to give comments for each item separately and for the scale/index as a whole.

Figure 5: A generic page example from the expert interview form

CONSTRUCT X: DEFINITION				
HOW REPRESENTATIVE IS THE ITEM OF THE CONSTRUCT X?	CLEARLY REPRESENTATIVE	SOMEWHAT REPRESENTATIVE	ITEM NOT REPRESENTATIVE	ADDITIONAL COMMENTS
ITEM 1	☐	☐	☐	
ITEM 2	☐	☐	☐	
ITEM 3	☐	☐	☐	
ITEM 4	☐	☐	☐	
IF YOU THINK THERE ARE ANY MAJOR MISSING ITEM(S), PLEASE SUGGEST WHAT SHOULD BE ADDED:				

The scale/index evaluation was performed in three waves in the period between 25.11.2013 and 20.01.2014. The scales/indexes were purified until no item was reported to be "not representative" and until there were no further remarks by judges. The initial pool of items underwent a series of alterations and changes (see Table 19) to finally result in the list of items as provided in Table 20 (scales) and Table 21 (indexes). From the 75 initial items, 15 were removed, 13 were modified and 15 new items were added. This resulted in the list of 75 items (questions/attitudinal statements) that were included in the questionnaire used in further quantitative studies. Once different socio-demographic, behavioural, validation and screening questions were included, the final questionnaire had 98 questions (see Appendix 16). This was in the same time the final output of the Study 2.

Table 19: Summary of changes in the initial number of scale/index items

		Change			Final
Scale/Index	Initial number of items	Items removed	Items modified	Items added	number of items
SKILLS	5	–	2	–	5
UCESK	3	–	–	–	3
EQPRF	4	1	–	1	4
SKEQ	5	1	–	–	4
COR	7	6	–	4	5
COPA	3	1	1	1	3
RESR	3	–	3	–	3
RESADJ	7	1	2	1	7
RESINT	3	–	–	1	4
SERVICE	6	–	–	–	6
IB	6	2	–	1	5
EXB	6	–	–	–	6
SYMB	6	–	–	–	6
SAC	5	1	1	4	8
VALUER	5	2	3	2	5
SAT	1	–	1	–	1
Total	75	15	13	15	75

Table 20: The final list of scale items with item formulation, item anchors and item source

LABEL	ITEM FORMULATION	ITEM ANCHORS (1/7)	POSITION IN THE QUESTIONNAIRE	SOURCE
SKILLS				
SKILLS_1	In terms of taking photographs, I consider myself to be	not at all talented/very talented	9	Qual.research
SKILLS_2	In terms of taking photographs, I consider myself to be	not at all exper./very experienced	10	Qual.research
SKILLS_3	In terms of taking photographs, I consider myself to be	not at all creative/very creative	11	Qual.research
SKILLS_4	In terms of taking photographs, I consider myself to be	very poor at phot./very good at phot.	12	Qual.research
SKILLS_5	In terms of taking photographs, I consider myself to be	not at all skilful/extremely skilful	13	Qual.research
UCESK				
UCESK_1	I already had excellent knowledge about what this situation would require in order to take a good photograph	strongly disagree/strongly agree	18	Qual.research
UCESK_2	I already had excellent knowledge about how to set everything up in order to produce a good photograph in this situation	strongly disagree/strongly agree	19	Qual.research
UCESK_3	I already had excellent knowledge about how to capture a good photograph in this type of situation	strongly disagree/strongly agree	20	Qual.research
EQPRF				
EQPRF_1	The equipment could do all the things I wanted it to do	strongly disagree/strongly agree	21	Qual.research
EQPRF_2	The equipment I used is known for its high performance	strongly disagree/strongly agree	22	Qual.research
EQPRF_3	The equipment I used is known for taking excellent photographs	strongly disagree/strongly agree	23	Qual.research
EQPRF_4	Overall, for this situation my photographic kit was excellent	strongly disagree/strongly agree	24	Expert
SKEQ (Park, Mothersbaigh and Feick, 1994)				
SKEQ_1	I had a very good level of knowledge about the equipment I used	strongly disagree/strongly agree	25	Theory
SKEQ_2	I had a lot of experience with the equipment I used	strongly disagree/strongly agree	26	Theory
SKEQ_3	I had previously gathered a lot of information about the equipment I used	strongly disagree/strongly agree	27	Theory
SKEQ_4	I was very confident using this equipment	strongly disagree/strongly agree	28	Theory
COR				
COR_1	The context for taking photographs was just as I wanted	strongly disagree/strongly agree	29	Expert
COR_2	The situation was excellent for taking photographs	strongly disagree/strongly agree	30	Expert
COR_3	Everything that made up context was excellent	strongly disagree/strongly agree	31	Expert
COR_4	The context lent itself perfectly to the shoot.	strongly disagree/strongly agree	32	Expert
COR_5	Overall, the shooting conditions were excellent	strongly disagree/strongly agree	33	Qual.research
COPA				
COPA_1	Without these particular participants the photo wouldn't be as good	strongly disagree/strongly agree	36	Expert
COPA_2	The contribution of the participants was excellent	strongly disagree/strongly agree	37	Qual.research
COPA_3	Overall, the participant(s) was/were very important for the way the photographs turned out	strongly disagree/strongly agree	38	Qual.research

Table 20 (continued): The final list of scale items with item formulation, item anchors and item source

Label	Item formulation	Item anchors (1/7)	Position in the questionnaire	Source
RESR				
RESR_1	I had everything I needed to take the photograph successfully	strongly disagree/strongly agree	39	Expert
RESR_2	I had everything I needed to capture a good photograph	strongly disagree/strongly agree	40	Expert
RESR_3	All the resources I had at my disposal were excellent for capturing the photograph I wanted	strongly disagree/strongly agree	41	Expert
RESINT				
RESINT_1	I shot the photograph(s) when I thought everything was well set up	strongly disagree/strongly agree	53	Qual.research
RESINT_2	I shot the photograph(s) when I thought it was the right moment	strongly disagree/strongly agree	54	Qual.research
RESINT_3	I shot the photograph(s) when I thought everything was ready	strongly disagree/strongly agree	55	Qual.research
RESINT_4	I shot the photograph in such a way to produce a synergistic effect from all the resources I had available	strongly disagree/strongly agree	56	Expert
IB (Smith and Colgate, 2007)				
IB_1	In a technical sense, the photographs turned out very well	strongly disagree/strongly agree	64	Theory
IB_2	In an aesthetic sense, the photographs turned out very well	strongly disagree/strongly agree	65	Qual.research
IB_3	The photographs were good enough to be framed	strongly disagree/strongly agree	66	Qual.research
IB_4	The photographs were good enough to be shown to others	strongly disagree/strongly agree	67	Qual.research
IB_5	Looking at the photographs, I really achieved what I wanted	strongly disagree/strongly agree	68	Expert
EXB (Smith and Colgate, 2007)				
EXB_1	Taking these photographs helped me record important memories/moments	strongly disagree/strongly agree	69	Qual.research
EXB_2	I enjoyed taking these photographs	strongly disagree/strongly agree	70	Theory
EXB_3	Taking these photographs was fun	strongly disagree/strongly agree	71	Theory
EXB_4	Taking these photographs was exciting	strongly disagree/strongly agree	72	Theory
EXB_5	Taking these photographs meant a lot to me	strongly disagree/strongly agree	73	Theory
EXB_6	Overall, taking these photographs was a great experience.	strongly disagree/strongly agree	74	Theory
SYMB (Smith and Colgate, 2007)				
SYMB_1	The photographs I captured speak for me	strongly disagree/strongly agree	75	Theory
SYMB_2	The photographs produced a strong reaction from others	strongly disagree/strongly agree	76	Theory
SYMB_3	The photographs helped me make a statement	strongly disagree/strongly agree	77	Qual.research
SYMB_4	The photographs really helped me to communicate with others	strongly disagree/strongly agree	78	Theory
SYMB_5	The photographs I took helped me present myself the way I wanted	strongly disagree/strongly agree	79	Theory
SYMB_6	Overall, the photographs I captured really helped me to express myself	strongly disagree/strongly agree	80	Qual.research

Table 20 (continued): The final list of scale items with item formulation, item anchors and item source

LABEL	ITEM FORMULATION	ITEM ANCHORS (1/7)	POSITION IN THE QUESTIONNAIRE	SOURCE
SAC (Smith and Colgate, 2007)				
SAC_1	Shooting these photographs took a lot of my energy	strongly disagree/strongly agree	81	Theory
SAC_2	I wish I had done something else instead of taking these photographs	strongly disagree/strongly agree	84	Theory
SAC_3	Taking these photographs was mentally challenging	strongly disagree/strongly agree	83	Expert
SAC_4	I had to spend a lot of money to be able to take these photographs	strongly disagree/strongly agree	84	Expert
SAC_5	Taking these photographs was extremely stressful	strongly disagree/strongly agree	85	Expert
SAC_6	I feel I paid a high price to take this photographs	strongly disagree/strongly agree	86	Theory
SAC_7	I feel I put too much effort into taking these photographs	strongly disagree/strongly agree	87	Expert
SAC_8	Overall, taking the photographs required a big sacrifice	strongly disagree/strongly agree	88	Theory
VALUER				
VALUER_1	I gained a lot from these photographs	strongly disagree/strongly agree	89	Expert
VALUER_2	The benefits I gained from these photographs significantly outweigh the sacrifices/efforts I made to capture them	strongly disagree/strongly agree	90	Qual.research
VALUER_3	Overall, the most recent photographs I took are very valuable to me	strongly disagree/strongly agree	91	Qual.research
VALUER_4	Using all the resources (my knowledge, equipment, context, actors) helped me create a photograph of value to me	strongly disagree/strongly agree	92	Expert
VALUER_5	The process of taking this photograph was very valuable to me	strongly disagree/strongly agree	93	Qual.research
SAT				
SAT_1	I am extremely satisfied with my most recent photographs	strongly disagree/strongly agree	94	Qual.research

Table 21: The final list of index items with item formulation, item anchors and item source

LABEL	ITEM FORMULATION	ITEM ANCHORS (1/7)	POSITION IN THE QUESTIONNAIRE	SOURCE
RESADJ				
RESADJ_1	Adjustments on equipment settings	none/many	45	Qual.research
RESADJ_2	Adjustments to compensate for equipment that I did not have at the time	none/many	46	Qual.research
RESADJ_3	Adjustments to compensate for features that the equipment did not have	none/many	47	Qual.research
RESADJ_4	Adjustments to address the conditions of the context/situation	none/many	48	Qual.research
RESADJ_5	Adjustments to get the photographs from the right angle (including your own position)	none/many	49	Qual.research
RESADJ_6	Adjustments to set objects/subjects just as I wanted	none/many	50	Expert
RESADJ_7	Adjustments in order to set up everything right	none/many	51	Qual.research
SERV				
SERV_1	The photograph(s) was/were the best I could achieve with the equipment I had	strongly disagree/strongly agree	57	Qual.research
SERV_2	The photograph(s) was/were the best I could achieve with the knowledge I had	strongly disagree/strongly agree	58	Qual.research
SERV_3	The photograph(s) was/were the best I could achieve with the skills I had	strongly disagree/strongly agree	59	Qual.research
SERV_4	The photograph(s)was/were the best I could achieve given the focal objects/subjects	strongly disagree/strongly agree	60	Qual.research
SERV_5	The photograph(s) was/were the best I could achieve given the context	strongly disagree/strongly agree	61	Qual.research
SERV_6	The photograph(s) was/were the best I could achieve given the time I had for shooting	strongly disagree/strongly agree	62	Qual.research

5.2. Exploratory factor analysis (Study 3)

Factor analysis (FA) represents a range of statistical techniques with a purpose of discovering and confirming population-level (i.e. unobserved) structure underlying the variations of observed variables (Gorusch, 1983; Kim and Mueller, 1978). As such FA is pivotal to sound psychometric design and assessment of measures (Nunnally, 1994). In other words, FA provides diagnostic tools to evaluate whether the collected data are in line with the theoretically expected pattern, or structure, of the target constructs and thereby to determine if the measures used have indeed measured what they were designed to measure (Matsunaga, 2010). Two methods of FA exist: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) (Thompson, 2004). While both methods are used to examine the underlying factor structure of the data, they play quite different roles in terms of the research purpose: the former is used for theory building; and the later for theory testing (DeVellis, 2012).

EFA groups the variables into closely related subsets indicating underlying factors, as factors (latent phenomena) are believed to have caused the correlations among the variables (Tabachnik and Fidell, 2007). This is why the major use of EFA in social sciences is for the development of objective tests for measurements (scales) (DeVellis, 2012). EFA is only applicable to the data set made of purely reflective items (variables). The aims of EFA are to identify the underlying structure of the dataset, to examine if scale item were correctly assigned and explore whether any alterations should be made to improve the scales[20].

Given that the items were assigned to their corresponding scales and face and content validity was assessed by the panel of experts – the questionnaire for survey was designed. The next phase of EFA is data sampling that will be explained in the next section.

[20] Some of the corrective actions are: removing an item, adding an item or reassigning an item to a different scale

5.2.1. Data sampling

Sampling is an essential research process that involves drawing a group of sampling units from the target population in order to gather information on certain topics of interest. According to Malhotra (2010) the sampling process (acquiring empirical data) contains 5 phases, which should provide the answers to the questions provided in brackets:

1. ***DEFINING THE TARGET POPULATION*** (Who is wanted in the study?)
2. ***DEFINING SAMPLING FRAME*** (What is the source of respondents?)
3. ***DETERMINING THE SAMPLE SIZE*** (How many respondents are needed?)
4. ***CHOOSING SAMPLING TECHNIQUE*** (How will the participants be given a chance to take part in the study?)
5. ***EXECUTING THE DATA SAMPLING*** (How is the data going to be collected?)

Each of the sampling phases is now discussed. A range of problems relevant for each particular phase were addressed and solution provided to ensure that the best quality data was obtained given all the constraints.

5.2.1.1. Target population for Study 3

Having in mind the research context (camera usage) and language of the study (English) a number of section criteria were put in place to ensure the respondents of a desired demographic and behavioural profile were surveyed. For this research, the following characteristic were drafted:

- Older than 16;
- Citizens/habitants of the USA. (Only the English speaking countries were considered. The USA was first choice given its large population and possibility of access);
- Owners of a camera of some description. It was assumed that camera ownership was an important indicator of whether someone was a camera user or not. Furthermore, it was assumed that by owning a camera there was an increased chance that a respondent: (a) had recently used a camera; and (b) would be able to recall their most recent camera usage;

- People who had recently taken photographs. The word 'recently' was explicitly defined as the most recent camera usage where participants could recall the details (i.e. the equipment used, the settings and adjustments applied, the way the photographs turned out etc.).

5.2.1.2. Sampling frame: Amazon Mechanical Turk as a source of respondents

One of the important considerations in every study is where the participants will be sampled from. In the ideal case, a researcher has a list of all members of the population and draws their sample from the list. However, in majority of real-life research situations this is not the case. Choosing a sampling frame – a source from which respondents will be selected, is matter of both theoretical and practical considerations (Malhotra, 2010; Field, 2013). For the Study 3, mTurk was selected. The arguments in support for this decision are now provided.

MTurk is an online crowdsourcing platform that provides fast and inexpensive access to a diverse range of research participants (Mason and Suri, 2012). It is a virtual labour market place where companies or individuals (called *requesters*) create and advertise different paid tasks (called *human intelligence tasks* or HIT) that are accepted and completed online by the human workers (called *workers*[21]). Once the task has been completed by workers, requesters have an option to accept or reject the result of each individual HIT before releasing payment. While monetary rewards act as primary motivation of workers, building a good reputation (by having a task approved by the requester) is another important (non-monetary) reward that helps workers strengthen their mTurk profiles and thus increase their chances of winning further HITs. MTurk allows requesters to predefine the eligibility criteria for workers admission into an HIT. For example a requester can set up the minimal HIT approval rate for all previously completed requesters HITs (%), the minimal number of HITs approved, worker's geographic location etc. This way the researcher can create an initial set of filters and opt for workers who are most likely to complete a HIT in a satisfactory fashion. For example, for the purpose of this study, the mTurk workers eligibility criteria were defined to comply with the following three HIT preconditions:

[21] In 2010 Amazon mTurk reported 200,000 registered workers (Ross et al., 2010)

- Workers had to have at least 50 completed tasks (HITs) via mTurk. This was done in the first place to avoid complete novices and/or mTurk workers that have started a new account due to a poor work history;
- Workers had to have minimal work approval rate of 97%. This ensured that only diligent and proved workers, expected to provide good quality responses, were selected into the study; and
- Workers had to live in and take the survey in the USA. This ensured avoiding respondents from culturally different countries that were active on mTurk only for monetary reasons.

In academia MTurk is argued to be an attractive and viable alternative to standard university participant pools for the purposes of collecting survey data for behavioural research (Behrend et al., 2012; Paolacci et al., 2010). MTurk responses were found to have good psychometric properties (Buhrmester et al., 2012) while a series of classical findings in behavioural economics were successfully replicated on mTurk samples (Horton et al., 2011). Berinsky et al. (2012) found that mTurk recruited respondents were often more representative of the general population than in-person convenience samples. Rand (2012) also provided evidence of the validity of demographic data collected via mTurk. Behrend et al. (2011) found that findings on MTurk samples have similar if not better data quality and reliability compared to findings on traditional (in-lab) samples. Aside from slightly higher participant rejection rates, mTurk data are almost indistinguishable from laboratory data (Sprouse, 2011) while mTurk workers exhibit behaviour identical to lab-research informants (Paolacci et al., 2010).

However, MTurk samples do have a few downsides. Parallel with confirming the validity and good quality of mTurk data Goodman et al. (2012) and Rand (2012) found that mTurk participants were likely to pay less attention to experimental materials, thus reducing the statistical power of the study. However, this argument has been applied to all on-line based experiments (Oppenheimer et al., 2009; Stanton and Rogelberg, 2001). Researchers using mTurk samples should, therefore, put efforts into ensuring that mTurk participants read and understand research guidelines. One of the ways to deal with this issue is to place 'catch trials' in the survey. A 'catch trial' question serves the purpose of identifying inattentive subjects (Oppenheimer et al., 2009). In their experiment, Kittur et al. (2008) demonstrated

that once the catch trial question is successfully passed by participants, they carry on reading more attentively. Thus, a catch trial was implemented in our questionnaire. At page 10/27 in online questionnaire, the instructions requested that participants to skip to the next page instead of answering the question below the instructions. The responses collected on this 'catch trial' helped to screen out inattentive participants and exclude their responses from analysis.

Among other downsides, mTurk participants also have a tendency to cheat (Horton et al., 2011) and give socially desirable responses (Behrend et al., 2011). However, incentives perceived as fair decrease participants' tendency to cheat (Goodman et al., 2012) and increase a feeling of commitment for providing thoughtful responses (Behrend et al., 2011). Therefore, a preventive measure for cheating behaviour could be found in fair rewards. Given that financial rewards play an important role in the motivation of mTurk workers (Behrend et al., 2011) and determine how the respondent engage with the survey (Goodman et al., 2012), the issue of choosing a 'fair reward' was important. Therefore, the reward trends in mTurk and academic literature using mTurk were analysed. In both cases, only the reward amounts for survey participation was considered. Given that the estimated duration of the survey was 15 minutes, this completion time was used as a basis for comparison. The analysis of HITs in mTurk showed that requesters were offering between $0.01 and $9 for survey participation (the rewards above $1 were generally an exception). In particular, the 15 minute surveys were generally rewarded with $0.25–$1. Relevant publications reported paying mTurk workers between $0.15 and $1.50 for 15 minute surveys (see for example Paolacci et al., 2010; Goodman et al., 2012; Berinsky et al., 2012; Buhrmester et al., 2011; Behrend et al., 2011; Sprouse, 2011). Considering the reward evidence provided, it was decided to offer mTurk workers $1 for survey, along with the possibility to take part in one £100 (equivalent to $170) Amazon voucher prize draw.

Despite these identified weaknesses, mTurk was still chosen because, on balance: (a) it was seen to offer a good quality online data collection platform; (b) had an increased likelihood to produce a reasonably representative sample; and (c) offered some important data verification approaches.

5.2.1.3. Sample size

The sample size was determined by taking into consideration: (a) the sample size requirements of EFA; and (b) the available research budget of $550 for Study 3. Namely EFA requires 5 to 10 participants per variable (Kass and Tinsley, 1979; Tinsley and Tinsley, 1987) or at least 300 observations so that an unbiased solution can be achieved (Tabachnik and Fidell, 2007; Guadagnoli and Velicer, 1988; Kass and Tinsley, 1979). Comrey and Lee (1992) consider 300 as good, 500 as very good and 1000 as an excellent sample size for this purpose. Given that it was decided to reward successful responses with $1 it was predicted that 500 responses could be obtained at maximum (Amazon mTurk charges service fee at the rate of 10% of the award price). This sample size, along with 61 variables included in the EFA, gave a ratio of 8.2 observations per item. Therefore, the EFA sample size requirements regards to both item/observations ratio and the total sample size were met.

5.2.1.4. Sampling method: quota sample

In an extensive literature on sampling methods in quantitative research studies, there is a clear preference for probability over non-probability sampling, given that former has numerous advantages (Babbie and Maxfield, 2014). Some of these advantages are generalisation of results from the sample to the population, estimation of parameters and the ability to calculate sampling errors and confidence intervals (Malhotra and Birks, 2007). The advantages stem from the fact that a sample was chosen randomly (by chance) and each member of a focal population had a non-zero chance of being included in the sample. Thus, the likelihood of drawing a sample with certain features and obtaining certain results on a sample can easily be calculated. In contrast to non-probability sampling, probability sampling is considered objective, given that selection of sampling units is carried out randomly and without the interference of the personal judgment of the researcher (Babbie, 2012). However, random sampling requires a sampling frame (in terms of an exhaustive and complete list of all members of a population). If there is no available population frame, quota sampling can be a useful approach (Black, 2011; Monette et al., 2013).

Quota sampling is a non-probability sampling technique with an aim to produce a sample that mirrors a population in terms of the relative proportions of people in different

categories (such as gender, age, income, employment) (Bryman, 2008). The technique involves dividing a population into various categories and then setting quotas on the number of elements to select from each category (Monette et al., 2013). Once the quota for a category is reached no more sampling units of that kind are selected into the sample.

Experts and scholars have divided views on the merits and reliability of quota sampling. Apparent merits of quota sampling are its relative low cost and quick data collection times. Furthermore, quota samples were found to obtain results close to those for conventional probability sampling if a number of quality assurance procedures are implemented (Getz, 2000; Sudman, 1980). Although not as accurate as random sampling, quota sampling can be used safely if constraints are imposed on the freedom of the interviewer's influence on choosing participants. In these circumstances the quota sampling can be highly reliable, rendering the high costs of random sampling unnecessary (Moser, 1952).

On the other hand, quota sampling was criticised for several weaknesses. According to Monette et al. (2013), the main drawback of a quota sampling lies in the subjectivity of the interviewer that performs the selection. One of the ways to prevent this bias is to avoid researcher's judgement playing a part in the selection of participants. This can generally be done by letting a "machine" assess whether a respondent fits into a predefined study eligibility criteria or not. Unlike in mall and street surveys, the battery of screening questions in an online survey prevents researcher's selection bias coming into force. In this study survey participants were approved by the mTurk engine following the successful pass of a series of the eligibility criteria screening questions.

The quota sampling is also criticised for its inability to produce generalizable findings. Even when sample composition mirrors that of the population with respect to the control characteristics, one cannot infer from the sample findings to the general population because the assumptions of probability theory do not apply (Malhotra, 2010). Having said this, it is very difficult or even impossible to prove that the quota sample is representative of the target population. However, a similar critique can also be applied to the family of random sampling techniques, especially those applied in social sciences. A social science researcher mainly deals with individuals that can only be interviewed if they agree to participate. By refusing/declining to participate in the study respondents contribute to the non-response

error/bias. What exacerbates the problem is the fact that the majority of people decline to participate in surveys regardless of the survey modality (online, face-to-face, telephone), with response rates showing a chronic declining trend (Stoop, 2008). This implies that most of the publications in social sciences nowadays are built on a group of participants that consciously agreed to be part of the study. The point is that we cannot infer if the results among non-respondents would be different compared to results obtained on the group of respondents (Moser, 1952). Therefore, studies built on probability samples should not be regarded as better *per se*. As Postoaca (2006) puts it – there is no fully unbiased data collection method.

In this study, a probability sampling was not a viable option. Firstly, an exhaustive list of camera users in the USA with their contact details does not exist. Therefore, it was unknown who population of camera owners was, and there was no sampling frame that allowed for drawing a random sample. What was available was a sampling frame of mTurk – which cannot be considered as equivalent of the US population, but is a feasible solution and a proxy to obtaining results on a large scale from camera users of a diverse demography that use Internet and are enrolled in mTurk. However, the exhaustive list of mTurk users was not available, therefore, the sampling frame (the actual list) was not accessible. Given all of this, it was decided to try to just replicate the population of the USA according to gender and employment status as per the 2009 and 2010 U.S. Census Bureau data (2012a, 2012b, 2012c). The quotas were assigned so that the proportion of the sample elements possessing the control characteristics was the same as the proportion of population elements with these characteristics (Malhotra, 2010). This was done to avoid results being skewed towards more knowledgeable and more involved camera users (most likely younger, male, well educated, above average income, DSLR camera owners) because the study was interested in all camera users. Based on the sample size, gender and employment data from the U.S. Census Bureau the planned quotas for the EFA study were established (see Table 22).

Table 22: USA composition according to gender and employment status – planned quotas

USA (n=500)	U.S. CENSUS (2012a,b,c)	PLANNED QUOTAS
GENDER		
Male	49.0%	245
Female	51.0%	255
EMPLOYMENT STATUS		
Employed	64.8%	324
Self-employed	3.2%	16
Unemployed	9.6%	48
Student	6.4%	32
Retired	10.8%	54
Other	5.2%	26

5.2.1.5. Data collection execution and response quality screening

The data collection lasted 11 days, from 24.04.2014 until 04.05.2014 and was performed using an online questionnaire developed in Qualtrics[22]. Given the critical importance of having the good quality data during the process of data collection response quality screening was performed in several iterations. It had to be done manually given that Qualtrics site automatically decreased the quotas immediately following survey completion. Thus, poor responses needed to be removed regularly to stop the software rejecting participants based on full quotas. Based on these screenings, quotas were readjusted so that the data collection phase of Study 3 resulted in 500 valid responses that met all the quality requirements (listed and explained below). The following quality screening measures were performed:

- Checking that responses come from US IP addresses only. All the IP addresses from outside the USA were removed from the dataset and those participants were not compensated.
- Checking that IP addresses were unique in the dataset. Multiple responses coming from one IP address were removed;
- Checking that workers mTurk IDs are unique in the dataset. Multiple responses coming from the same worker's ID were deleted altogether;
- Checking that workers had successfully passed the 'catch trial' question to identify inattentive respondents. Given the length of the questionnaire (98 questions), the presence of cheating and hasty work was expected. The respondents who failed to

[22] www.qualtrics.com

follow the simple instruction to skip a question were screened out due to inattentive work;

- Checking for extremely low response time to identify poor or low-effort responses (Mason and Suri, 2012). Four minutes was established in a pilot study as an absolute minimum regards the survey completion time. The average time needed for survey completion was 12 minutes 22 seconds and all responses that were completed in less than four minutes were screened out; and
- Checking for the responses with low dispersion or low-entropy pattern of responses to identify potentially low quality responses (Zhu and Carterette, 2010). Namely, cases of *straight lining* (the same response option is always chosen throughout the survey) and *disguised straight lining* (the response pattern alternates between a small numbers of options throughout the survey in an obvious fashion) were sought. The straight liners and disguised straight liners were identified by applying a standard deviation calculation on all the items that were used for EFA analysis (questions that were responded on 1–7 Likert scale). These invalid responses had standard deviation below .80.

In total 765 camera users completed the survey. From those removed, in 221 cases non-US IP addresses were identified. The catch trial question eliminated an additional 13 responses. A further six responses were eliminated because the survey was completed in less than four minutes. 28 responses were deleted due to duplicated IP addresses. Six responses were removed due to straight and/or disguised straight lining. At the end the final dataset contained 500 'clean' responses that satisfied the predefined quota requirements.

The planned quotas shown in Table 22 were fully achieved. The socio-demographic and behavioural profile of the US sample is provided in Table 23 and Table 24.

Table 23: Socio-demographic profile of the US sample

USA (n=500)	Valid %	Frequency
Gender		
Male	49.0%	245
Female	51.0%	255
Employment status		
Employed	64.8%	324
Self-employed	3.2%	16
Unemployed	9.6%	48
Student	6.4%	32
Retired	10.8%	54
Other	5.2%	26
Education		
GCSE/O'Level	24.1%	120
A Level	21.5%	107
Bachelor's Degree	41.4%	206
Master's Degree	9.5%	47
PhD	2.0%	10
Other	1.4%	7
Income (USD)		
0-15,000	14.9%	74
15,001-30,000	25.9%	129
30,001-45,000	20.7%	103
45,001-60,000	14.7%	73
60,001-75,000	9.4%	47
75,001-90,000	5.8%	29
90,001-105,000	3.0%	15
105,001-120,000	2.4%	12
120,001+	1.0%	5
Prefer not to say	2.2	11
Age		
$\bar{X}$=36.2, Median=32, Mode=25, σ=13.14		
X_{min}=21, X_{max}=81, $X_{.25}$=26, $X_{.75}$=42		

Table 24: Behavioural profile of the US sample

USA (n=500)	Valid %	Frequency
Place of photography in life of a camera user		
Occasionally capturing photographs	36.4%	182
Regularly capturing photographs	34.0%	170
Hobby/keen amateur photographers	22.8%	114
Something between a hobby and a profession	6.0%	30
A profession/professional photographers	.4%	2
Something else	.4%	2
Camera type		
Smartphone/Mobile phone camera	27.0%	135
Compact/Point and shoot camera	26.0%	130
Compact zoom/Bridge camera	15.2%	76
Compact system/Mirrorless camera	1.8%	9
DSLR camera	27.6%	138
Other type of camera	2.4%	12
Camera brand		
Apple	8.6%	43
Canon	29.9%	149
FujiFilm	3.0%	15
Kodak	5.0%	25
Nikon	19.2%	96
Nokia	1.6%	8
Panasonic	3.4%	17
Pentax	.8%	4
Olypmus	3.2%	16
Samsung	11.6%	58
Sony	6.6%	33
Do not know	.6%	3
Other	6.4%	32

5.2.2. Analytic procedure

Following the data cleaning, the EFA was performed. Each scale was factor analysed both individually (individual FA) and jointly with other scales (aggregated FA) to demonstrate that the scales had good psychometric properties. In order to obtain a valid factorial solution a full range of procedural issues and analytic rules were followed in line with EFA best practice. The rest of the Section 5.2.2 explains the initial procedural considerations, the evaluation criteria and the results.

5.2.2.1. Initial procedural considerations

Prior to running FA, researcher chooses statistical software and the analytic method, including the extraction and rotation options.

1. ***STATISTICAL SOFTWARE*.** IBM SPSS 22[23] as a well-know and widely accepted statistical software was used.
2. ***EXTRACTION METHOD*.** *PRINCIPAL AXIS FACTORING* (PAF) was selected, given that this extraction technique focuses only on shared variance while ignoring variance unique to indicators and sources of error (Tabachnik and Fidell, 2007). This is important because shared variance is the area most likely 'indicating' a factor, while the variance unique to indicators and sources of error are containing 'noise' information. Therefore, by using this method, only the relevant (shared) variance to extrapolate underlying factors was considered.
3. ***ROTATION METHOD*.** For the selection of an adequate rotation method, two families of rotation techniques available in the SPSS: (a) orthogonal and (b) oblique rotations are available. Oblique rotations should be used when there are grounds to expect that factors might be correlated (Netemeyer et al., 2003; Lawley and Maxwell, 1971), otherwise the loadings will be overestimated (Loehlin, 1998). Field (2013) argues that orthogonal rotations are completely inappropriate for any data involving humans. Given the expected correlation between certain factors employed in the study (such as SKILLS, UCESK and SKEQ) **direct oblimin** rotation was chosen.

[23] http://www-01.ibm.com/software/uk/analytics/spss/

5.2.2.2. Factorial solution evaluation criteria

As advised by Worthington and Whittaker (2006) and Tabachnik and Fidel (2007) three groups of statistical quality evaluation criteria were used to verify the goodness of the FA solution:

1. ***FACTORABILITY OF THE CORRELATION MATRIX CRITERIA.*** These criteria relate to the magnitude of correlations in the variable matrix. In order to extract factor(s), the dataset has to be suitable for FA. This requires variables with correlations significantly different from 0. The relevant factorability tests are:

    - ***BARTLETT'S TEST OF SPHERICITY*** estimates the probability that correlations among variables in the observed dataset are equal to 0 (Bartlett, 1950). The test should be significant ($p<.05$) so that the hypothesis of all correlations being equal to 0 is rejected. Otherwise, there is no likelihood of a factorial solution. However, the test is susceptible to the influence of sample size, and is likely to be significant in large samples regardless of correlation magnitudes (Tabachnik and Fidel, 2007).
    - ***KAISER-MEYER-OLKIN MEASURE OF SAMPLING ADEQUACY (KMO)*** tests if the sample size is adequate for a given FA (Kaiser, 1970). The KMO represents the ratio of the squared correlation between variables to the squared partial correlation between variables (Field, 2013). Thus, it indicates the extent to which a correlation matrix actually contains factor (Tabachnik and Fidel, 2007). Kaiser (1974) considers KMO>.50 as barely acceptable, .60<KMO<.70 as mediocre, .70<KMO<.80 as good and KMO>.90 as superb. As advised by Tabachnik and Fidell (2007), a KMO>.60 is considered acceptable for this study.

2. ***CRITERIA FOR ITEM RETENTION*****.** The item retention criteria provide answers regarding how reliable and adequate selected items are for the FA**.** The relevant item retention tests are:

    - ***INTER-ITEM CORRELATIONS*** show the correlations between all pairs of analysed variables. The minimal inter-item correlation coefficient adopted for this study was .40 as advised by Clark and Watson (1995). Variables with inter-item correlations below .40 were removed from the solution.

- ***COMMUNALITIES*** stand for the proportion of variance that one item shares with other items. Items with communalities below .40 were dropped out from the FA, as suggested by Worthington and Whittaker (2006).
- ***CORRECTED ITEM TO-TOTAL CORRELATIONS*** is the correlation of an indicator with the sum of the remaining indicators after removing the considered indicator (Norušis, 2005). To retain an item in the factor solution, its corrected item to-total correlations should be above .50 as advised by Bearden, Netemeyer and Teel (1989), Bearden et al. (2001) and Zaichowsky (1985).
- ***FACTOR LOADINGS ON ITEMS (EXPLAINED VARIANCE)*** describes the extent to which changes in a factor are reflected in the items. The higher the loading the more variance will be shared between a factor and an item. Loadings in excess of .71 are considered as excellent, .63 as very good, .55 as good, .45 as fair and .32 as poor (Comrey, 1973). For this study, the minimal acceptable factor loading was .45 (Comrey and Lee, 1992).
- ***CROSS LOADINGS***. A good factor solution should have "pure" variables i.e. variables that have high correlations with only one factor (Tabachnik and Fidell, 2007). Therefore, the items with absolute loadings higher than .40 on two or more factors were removed until a simple factor structure was obtained (Hair, Black, Babin et al., 2010). Second cross loading criterion for item deletion was that the difference between two factor loadings on the same item should be less than .15 (Worthington and Whittaker, 2006).
- ***CRONBACH'S*** α is scale reliability indicator that measures the proportion of total variance in a scale attributable to a common source – presumably the real value of the variable that the items attempt to capture (DeVellis, 2012). Values above .70 are generally indicative of a consistent scale (Nunnally, 1994).

3. ***CRITERIA FOR FACTOR RETENTION.*** Important consideration in FA is the number of factors to extract. Scholars are divided between following what makes sense (Tabachnik and Fidell, 2007) and following statistical rules of thumbs such as eigenvalues (Kaiser, 1958).

    - ***KAISER CRITERION*** is based on eigenvalues which helps with the identification of factor importance (Kaiser, 1958). The criterion indicates the amount of variance in the set of items accounted for by a given factor (Worthington and Whittaker, 2006) and should be at least 1 to keep the factor. However, Field (2013) points

out that values slightly below 1 are also acceptable, while decisions about the number of factors should also be based on pragmatic rationales given that a good FA 'makes sense' and a bad one does not (Tabachnik and Fidell, 2007). This for this study factors with eigenvalues higher than 1 were considered good, if the unidimensionality of a factor is being achieved.

- ***APPROXIMATED SIMPLE STRUCTURE*** is a factor pattern in which a group of items load strongly on only one factor while having no, or only a very small loading, on other factors in the solution (McDonald, 1985). In FA, efforts to produce a factor solution with simple structure are central to decisions about the final numbers of factors and decision about item retention in a given FA solution (Worthington and Whittaker, 2006). Thus, for this study, the FA was iterated until the simple structure (such as the one shown in Table 26) was achieved.

The summary of the FA evaluation criteria, with the threshold values followed in this study, is provided in Table 25.

Table 25: Evaluation criteria for EFA solutions with threshold values

TEST	THRESHOLD VALUES/RULES
BARTLETT'S TEST OF SPHERICITY	significant ($p<.05$)
KMO	>.60
INTER-ITEM CORRELATIONS	≥.40
COMMUNALITIES	≥.40
CORRECTED ITEM TO-TOTAL CORRELATIONS	>.50
FACTOR LOADINGS	>.45
CROSS LOADINGS	<.40 on 2 or more items and diff. between cross loadings <.15 (applicable to aggregated EFA only)
CRONBACH'S α	>.70
KAISER CRITERION	eigenvalue ≥ 1 as long as factors are unidimensional; (applicable to aggregated EFA only)

5.2.3. EFA findings (Study 3)

The FA was performed using principal axis factoring with direct oblimin rotation. First, 13 individual FA were performed to test whether the hypothesised individual scales were unidimensional and whether all of the items had good measurement features. Once the scales were separately tested and refined, the aggregated FA[24] was performed (all scales analysed jointly). In the evaluation of both the individual and aggregated FA solutions criteria and guidelines discussed in the previous section were followed.

As expected in each individual FA, the results showed the existence of only one underlying factor, thus confirming the hypothesised unidimensionality of the scales at the individual level. The individual FA of the 13 scales revealed that only 2 items (RESINT_4 and SAC_2) out of the initial 61 had to be removed (see Appendix 4). Purified individual scales demonstrated high reliability given that the Cronbach's α of the final individual factor solutions ranged from .80 to .92, which is considerably higher than the required minimum of .70.

The subject of the aggregated FA was 56 items that were hypothesised to produce a 13 factors solution. The FA procedure was iterated until a simple factor solution was obtained. Two items had to be removed – EXB_1 and IB_1, given that they had factor loadings below .45 (these items had factor loadings of .43 and .40 respectively). After eliminating EXB_1 and IB_1 a simple structure solution with 11, instead of the expected 12 factors, was obtained. Namely items for UCESK and SKEQ appeared to be a single factor. These two set of items are indeed closely related – they both look at different aspects of photographic knowledge employed in a camera usage episode. In order to decide whether to leave these two sets of items merged into a potentially new scale or to force a split solution, a separate FA including only the items for UCESK and SKEQ was run. This FA revealed two factors – one with UCESK

[24] The COPA scale, exclusive to the value co-creation model, was evaluated at the individual level only. The 12 multi-item scales that were common for both the *customer's value creation* and *value co-creation* models were subject to an aggregated FA. This was done in order to take advantage of the large sample (n=500) of the original dataset. Otherwise the original dataset would have to be split into two subsamples and two independent aggregated FA would have had to be run – the one for customer's value creation (n=341) and the other for value co-creation model (n=159). The relatively small samples sizes could then have brought the EFA's reliability into question (Field, 2013; Guadagnoli and Velicer, 1988). Therefore, the decision was made to proceed with aggregated testing and confirmation of the scales common for both models. Starting from Study 4a and on, COPA is analysed jointly with other constructs

and the other with SKEQ items only. Therefore, given that the new UCESK+SKEQ construct suggested by the aggregated FA was not unidmensional it was decided to force the aggregated FA to produce a 12 factors solution. In the forced solution, the FA split UCESK and SKEQ items (but left SKEQ with eigenvalue slightly below 1). It was decided to keep the solution with 12 factors given what was expected prior to analysis and given the confirmed unidimensionality of all scales in this FA solution. The correctness of this 12-factor forced solution was then to be tested in the CFA study performed on a completely new sample. If this decision was correct, the CFA would demonstrate a good match between the hypothesised factor structure and the data.

The final aggregated FA solution showed good statistical properties. A superb KMO of .927 was obtained. The χ^2 value for the Bartlett's test of sphericity was significant (χ^2=23,344.55, df=1,711, p=.000) indicating that the FA solution was appropriate for the given data. The final factor solution resulted in a simple structure with 12 factors using 54 of original 56 items, with 75.36% of the total variance explained. All communalities were above .40 with the majority above .50. All of the items had loadings above the desired threshold of .45 with the vast majority of items scoring above .71 which is considered to be an excellent loading score (Comrey, 1973). This indicates good convergent validity of the constructs. Scales also demonstrated high reliability given that Cronbach's α ranged between .80 and .92 for each of the scales, which is considerably higher than the required minimum of .70.

Table 26: Aggregated EFA results

	Factors												
	1	2	3	4	5	6	7	8	9	10	11	12	Comm.
IB_5	.686												.795
IB_4	.552												.658
IB_3	.496												.502
IB_2	.473												.772
SAC_8		.846											.846
SAC_6		.828											.738
SAC_5		.800											.804
SAC_7		.729											.795
SAC_4		.707											.474
SAC_1		.628											.784
SAC_3		.592											.846
SKEQ_2			-.824										.703
SKEQ_4			-.730										.701
SKEQ_1			-.707										.742
SKEQ_3			-.465										.515
COR_5				.884									.740
COR_3				.836									.486
COR_4				.742									.628
COR_2				.721									.773
COR_1				.480									.703
SYMB_3					.911								.834
SYMB_5					.812								.757
SYMB_4					.779								.812
SYMB_6					.748								.603
SYMB_1					.608								.777
SYMB_2					.603								.478
RESR_2						.921							.744
RESR_1						.877							.633
RESR_3						.639							.621
SKILLS_5							-.938						.622
SKILLS_1							-.855						.746
SKILLS_4							-.827						.769
SKILLS_2							-.710						.833
SKILLS_3							-.599						.658
EQPRF_3								-.861					.617
EQPRF_2								-.831					.770
EQPRF_4								-.741					.651
EQPRF_1								-.631					.578
RESINT_3									.864				.815
RESINT_1									.857				.619
RESINT_2									.504				.771
VALUER_4										-.735			.737
VALUER_2										-.734			.449
VALUER_1										-.718			.437
VALUER_3										-.662			.576
VALUER_5										-.540			.692
EXB_3											.843		.667
EXB_4											.743		.570
EXB_2											.732		.712
EXB_6											.700		.641
EXB_5											.572		.597
UCESK_1												-.791	.716
UCESK_3												-.782	.752
UCESK_2												-.764	.643
Eigenvalue	15.911	5.367	4.580	2.741	2.126	1.792	1.744	1.483	1.439	1.268	1.090	0.913	
Variance explained	29.465	9.938	8.481	5.076	3.936	3.318	3.229	2.747	2.665	2.348	2.019	1.691	
Crnobach's α	.852	.885	.866	.905	.922	.871	.913	.884	.800	.897	.907	.910	

IB: instrumental benefits, SAC: sacrifices, SKEQ: specific knowledge about equipment used, COR: contextual resources, SYMB: symbolic benefits, RESR: resources, SKILLS: skills, EQPRF: equipment performance, RESINT resource integration, VALUER value-in-use, EXB experiential benefits, UCESK usage context episode specific knowledge

5.3. Confirmatory factor analysis (Study 4a)

Study 4a or confirmatory factor analysis (CFA[25]) is a 2nd generation statistical technique commonly used for the purpose of scale development, verification and confirmation following EFA (Worthington and Whittaker, 2006). CFA requires the existence of prior theoretical knowledge about: (a) factor structure; and (b) relationships between observed (indicators) and latent variables (Tabachnik and Fidell, 2007; Worthington and Whittaker, 2006). Usually the knowledge is obtained either from the relevant literature or from preceding scale development EFA.

Once the underlying latent structure and the relationships between the observed and indicator variables are specified, the CFA performs a test against the data to confirm/reject the proposed theory (Wang and Wang, 2012). If there are no significant discrepancies between the proposed model and data, a researcher can claim to have confirmed that the data contains the specified number of latent variables (scales) with the items (observable variables) being properly assigned. This is the structural model fit assessment. A CFA also assesses the psychometric properties of scales and the quality of assigned indicators. The scales are confirmed to have good psychometric properties when scales are unidimensional and when there is convergent and discriminant validity (Kline, 2011).

According to Kline (2011: 112) CFA models have the following characteristics:

1. Each indicator is a continuous variable represented as having two causes: (a) a single factor that the indicator is supposed to measure; and (b) all other unique sources of influence (omitted causes) represented by error terms. Factors explain a portion of variance in an indicator, while measurement error stands for unique variance. Good indicators have more variance explained by the factor than by the error term;
2. The measurement errors are independent of each other and of the factors; and
3. All associations between the factors are unanalysed (the factors are assumed and allowed to covary).

CFA provides: (a) estimates of factors variances and covariances; (b) loadings of the

[25] CFA is a specific application of the covariance based structural equation modelling (CB-SEM)

indicators on their respective factors; and (c) the amount of measurement error for each indicator (Kline, 2011). If the researchers model is reasonably correct, then one should see that all indicators specified to measure a common factor have at least moderate standardised factor loadings and that estimated correlations between the factors are not excessively high (Kline, 2011). The former indicates convergent validity the later discriminant validity (Kline, 2011).

5.3.1. Data sampling

Data sampling follows Malhotra's (2010) 5-phases procedure (see Section 5.2.1). A range of problems relevant for each particular phase from this procedure was addressed and solutions were provided so that the best quality data is obtained given all the constraints.

5.3.1.1. Target population for Study 4

In Study 4[26], it was decided to obtain a sample from another English-speaking country other than the USA. The rationale behind this decision was a desire to create a strong theory. Namely, if the scales developed on the US sample also show good psychometric properties on the UK sample, it can be claimed that the scales in this study are well designed and mean strong measurement theory[27] was established. Consistent with the EFA study, for this study participants (camera users) of the following characteristic were drafted and implemented in the questionnaire through screening questions:

- Older than 16;
- Citizens/habitants of the UK;
- Owners of a camera of some description.
- People who have recently taken photographs.

[26] Study 4 has five phases labelled with letters a,b,c, d and e. They draw data from the same sample
[27] The generalizability of the findings can be achieved if the analyses using different and independent samples reveal the same factor structure (Field, 2013)

5.3.1.2. Sampling frame: Online access panel as a source of respondents

Given that mTurk was not available in the UK, an alternative was found in an online access panel. An online access panel is a group of people who have agreed to regularly participate in surveys run by a specific market or public opinion research organisation (Stoop, 2008). An online panel provider acts as a middleman between respondents and researchers, charging researchers for the service of sample provision and rewarding the panellists for the responses provided. Poynter (2010) outlines some common features of online access panels:

- The members of the panel know they are on a market research panel and have accepted the panel membership;
- The panel operator keeps socio-demographic and life-style information of panel members in their database, thus has the ability to draw samples based on selection criteria (age, education level, income etc.);
- The panel company protects the panellists' anonymity from the third parties;
- The panel company is in charge of disseminating survey invitations and incentivising respondents.

On-line panels have significantly grown in popularity in recent years due to the increasing Internet penetration and are increasingly used in academic research (Callegaro and DiSogra, 2008). Online panels offer a range such as: quick data collection, convenience and low cost (Poynter, 2010). Another important benefit of online panels is that panellists are less susceptible to social desirability bias compared to traditional interviewing techniques (Duffy et al., 2005). However, given the importance of having good quality data for academic research – it is worth discussing the potential pitfalls of this sampling frame and proposing strategies to avoid them.

Firstly, the sample drawn from a panel cannot be, *a priori*, treated as being representative of the wider population for two reasons. First, unless the Internet penetration is 100% the sample can, at best, be claimed to be representative only of the part of the population with Internet access (Callegaro, Baker, Bethlehem et al., 2014). Second, there is no way of knowing whether a representative sample of the wider population exists within the panel. Indeed, panel members and those who are not panel members are expected to differ (Poynter, 2010). For example, Vonk et al. (2006) found that panellists are more likely to be

heavy Internet users, less likely to belong to a minority group and more likely to live in big cities. However, since the Vonk et al. (2006) paper the state of affairs has changed tremendously. As of 2013, 83% of British households have access to the Internet (ONS, 2013b). Compared to 2006, the number of 'everyday Internet users' in the UK has increased to a staggering 80% – from 20 to 36 million 'everyday Internet users' (ONS, 2013b). Given these rapid changes it is a matter of question whether assertions about the Internet population being different from the general 'offline' population still hold true.

Secondly, results obtained using an online panel can demonstrate discrepancies (i.e. sample demographics) compared to traditional samples with probability panels performing better than non-probability panels (Callegaro, Villar, Yeager et al., 2014). The best way to control and potentially avoid these discrepancies is to obtain a sample in a way that matches a small number of key demographics of the target population, for example age, sex, and income (i.e. in other words using quota sampling) (Callegaro, Baker et al., 2014). This approach tends to work most of the time and performs well in cases where a research study consists of questions where the responses are not expected to be caused by differences between the panel and the target population (Poynter, 2010). It was, indeed, anticipated that the camera users in the online access panel would be no different (in terms of camera usage practices) from the general population of camera users just because the former are members of an online access panel. Panels with random selection as advised by Yeager et al. (2011) and Sherpenzeel and Bethlehem (2010), also helped the accuracy of results. Given this evidence, it was decided to opt for a panel provider that had the ability to randomly invite respondents from the panel into the survey.

Thirdly, Brown et al. (2012) found that online panels suffer from typical online research problems. Compared to respondents from traditional studies, they found that panellists tend to invest lower efforts and provide less accurate responses. For these problems (cheating, low motivation, inattentiveness), in this study a similar approach to the one applied in the Study 3. The only addition to this is the *r*[28] number of the inattentive panellist that was reported to the panel provider for the purpose of taking corrective measures.

[28] Unique invitation number that helps the panel provider in the identification of a survey participants identity

Given there is a number of online panel providers in the UK, a bid competition was organised. In total 8 highly reputable panel providers submitted their offers. After an evaluation of their quality standards, price levels and other relevant offer details, Norstat[29] was selected. This company is one of the leading panel providers in Europe operating in 19 countries and holding ISO 26362: 2009[30] quality certificate. Norstat is also a member of many professional associations such as DGOF[31] and ESOMAR[32]. Their panel size in the UK counts approximately 67,000 active panellists (for details see Appendix 5). Their average panel response rate in the UK is 25% and panellists receive a maximum of 6 survey invitations per month, which indicates a below average panellist work load (Callegaro, Villar et al., 2014).

The knowledge about potential threats and downsides coming from the propensities of panel research served as a guideline in sampling design and data collection.

5.3.1.3. Sample size

In order to establish a sample size, two factors had to be considered: (a) the CFA sample size requirements; and (b) the available budget. Given the foundational statistical theory of CFA, large samples are required for the analysis to produce stable parameter estimates (Bentler, 1995). Kline (2011) asks for at least 200 observations for any SEM including CFA. Grimm and Yarnold (1995) recommend between 5 and 10 participants per observed variable, which required at least 295 and at most 590 observations (based on 59 observed variables in the study). However, Bentler and Chou (1987) argue that the sample size calculation should be based on the number of parameters to be estimated by the CFA (in this case 174 parameters). This would have required between 870 and 1740 observations, which is far above sample sizes for standard publications based on CFA. However, Jackson (2001) provides evidence that the number of parameters does not appear to be as important as the overall sample size. This notwithstanding, Hu et al. (1992) found that CFAs based on

[29] www.norstatgroup.com

[30] ISO 26362: 2009 specifies the terms and definitions, as well as the service requirements, for organisations and professionals who own and/or use access panels for market, opinion and social research. It develops the criteria against which access panel providers can be evaluated and against which the quality of access panels can be assessed. The standard is applicable to all types of access panels, whether recruited and used online or offline (International Organization for Standardization, 2014)

[31] German Society for Online Research – www.dgof.de

[32] The European Society for Opinion and Market Research – www.esomar.org

maximum likelihood estimation demonstrated stability of estimates on samples that were larger than 500 observations. Given the limited budget of £1,200 and the figures discussed above, it was decided to go for the maximum possible sample size that could be purchased given the budget. The price paid to the panel provider per valid response was £2, which enabled the collection of 600 valid responses (n=600). Thus, the response/variable ratio of 10.17 and response/parameter ratio of 3.45 were achieved – the former slightly above the highest requirements of Grimm and Yarnold (1995) the later lower than the lowest ratio required by Bentler and Chou (1987).

5.3.1.4. Sampling method: Quota sample

Given the features of the sampling frame (no access to the full list of Nosrtat's panellists) and recommendations of Callegaro, Baker et al. (2014), quota sampling was again selected. Given that nothing was known about the population of camera owners in the UK[33], it was decided to replicate the population of the UK according to gender and employment status. What was indirectly available was the sampling frame of Norstat's access panel – which cannot be considered as equivalent of the population, but is a feasible solution and a proxy to obtaining results on a large scale from audiences of a diverse demography. Firstly the control categories – or quotas were developed. There were two control categories – gender and employment status. Based on the sample size, gender and employment data from the ONS reports (ONS, 2012, 2013a) the planned quotas for this study were established (see Table 27).

Table 27: UK composition according to gender and employment status – planned quotas

UK (n=600)	UK Census 2011	Planned quotas
Gender (Ons, 2012)		
Male	49.0%	295
Female	51.0%	305
Employment status (Ons, 2013a)		
Employed	52.16%	313
Self-employed	9.48%	57
Unemployed	4.43%	27
Student	9.26%	56
Retired	13.88%	83
Other	10.79%	65

[33] Only one Mintel report about camera users in the UK from April, 2013 that was showing sample results and therefore could not be used as definitive guideline regards population structure

5.3.1.5. Data collection execution and response quality screening

The data collection lasted 14 days, from 06.05.2014 until 19.05.2014. The average completion time was 18 minutes and 2 seconds (significantly longer compared to the mTurk sample). Unlike in the Study 3, the execution of the data collection process was in the hands of the panel provider. Norstat drew 13 random batches from the panel resulting in a total of 14,703[34] invites (mostly due to difficulties in accessing the population of students). In total 2,720 people entered the survey, which gives a response rate of 18.5% before filtering.

During the process of data collection response quality screening was performed in several iterations and quotas were readjusted so that the output of the data collection phase of Study 4a resulted in 600 valid responses that meet all the quality requirements (explained below) and the predefined quota targets. The following quality screening measures were performed:

- Checking that the responses fitted into target population criteria;
- Checking that the responses came from UK IP addresses only. The IP verification was this time programmed into the Qualtrics online survey platform, and everyone with a non-UK IP address was screened out by Qualtrics;
- Checking that IP addresses were unique in the dataset. All responses coming from more than one IP address were removed altogether (if two responses came from the same IP address both would be removed);
- Checking that panellists' *r* values were unique in the dataset. Responses coming from the same *r* more than once were deleted altogether;
- Checking that panellists had successfully passed a the 'catch trial' question; and
- Checking for an extremely low work time to identify poor or low-effort responses. All the responses that took below 4 minutes for completion were screened out. Responses with low entropy (straight lining and disguised straight lining) were also removed from the sample.

Of the 2,720 people entering the survey in total 2,005 people were screened out (243 for not owning a camera; 943 people for not being able to recall their most recent camera usage;

[34] All responses (complete, incomplete, screen-outs) were registered and stored. Furthermore, the *r* value of all panellists who entered the survey was recorded

661 people for not falling into the required quotas; 158 people for not passing the catch trial question; 16 for being completed in less than 4 minutes; 9 because of straight lining and additional 90 because of disguised straight lining). The final sample had 600 good quality responses with planned quotas were fully met (n=600). This gave 4.08% final response rate (number of invitees as a basis) and 22% successful completion rate (number of respondents as a basis). Those panellists who successfully completed the survey were rewarded with £0.7 by Norstat. Table 28 and Table 29 provide the details of the sample's socio-demographic and behavioural profile.

Table 28: Socio-demographic profile of the UK sample

UK (n=600)	Valid %	Frequency
Gender		
Male	49.0%	295
Female	51.0%	305
Employment status		
Employed	52.2%	313
Self-employed	9.5%	57
Unemployed	4.4%	27
Student	9.3%	56
Retired	13.9%	83
Other	10.8%	65
Education		
GCSE/O'Level	23.9%	143
A Level	27.9%	167
Bachelor's Degree	27.4%	164
Master's Degree	12.9%	77
PhD	1.8%	11
Other	6.0%	36
Income (GBP)		
0-10,000	18.1%	108
10,001-20,000	25.3%	151
20,001-30,000	19.7%	118
30,001-40,000	9.7%	58
40,001-50,000	6.9%	41
50,001-60,000	3.5%	21
60,001-70,000	1.5%	9
70,001-80,000	.5%	3
80,001+	1.8%	11
Prefer not to say	13.0%	78
Age		
$\bar{X}$ =45.7, Median=47, Mode=60, σ=13.7		
X_{min}=16, X_{max}=80, $X_{.25}$=35, $X_{.75}$=58		

Table 29: Behavioural profile of the UK sample

UK (n=600)	Valid %	Frequency
Place of photography in life of a camera user		
Occasionally capturing photographs	37.3%	224
Regularly capturing photographs	37.0%	222
Hobby/keen amateur photographers	20.7%	124
Something between a hobby and a profession	3.8%	23
A profession/professional photographers	.3%	2
Something else	.8%	5
Camera type		
Smartphone/Mobile phone camera	20.1%	118
Compact/Point and shoot camera	37.9%	223
Compact zoom/Bridge camera	13.6%	80
Compact system/Mirrorless camera	3.6%	21
DSLR camera	24.1%	142
Other type of camera	.7%	4
Camera brand		
Apple	5.2%	30
Canon	22.5%	129
FujiFilm	10.5%	60
Kodak	2.1%	12
Nikon	16.0%	92
Nokia	2.1%	12
Panasonic	8.5%	49
Pentax	1.7%	10
Olympus	5.9%	34
Samsung	10.1%	58
Sony	8.2%	47
Do not know	.7%	4
Other	6.4%	37

5.3.2. Analytic procedure

Once the data was purified, the CFA was conducted. CFA is generally a straight forward process that ends once the initial theory is verified against the data set. CFA has strict demands in terms of the statistical features of the variables in the dataset. Therefore, all observables have to be checked for collinearity and normality. Also there should be no missing data. If the dataset is assessed as statistically adequate for the CFA, the researcher can then proceed to evaluate model fit, reliability and validity of the constructed scales and their individual items. Based on the obtained model fit parameters, a researcher assesses whether the initial theory can be confirmed or not. The rest of the section explains the initial procedural considerations, factor solution statistical evaluation criteria and CFA results.

5.3.2.1. Initial procedural considerations

Prior to running the analysis, a researcher has to make choices about the statistical software and the extraction and rotation methods. The decisions are detailed below.

1. ***SEM SOFTWARE.*** LISREL 8.80 was used. LISREL[35] is a software that is designed for the structural equation modelling analysis (SEM). It is one of the most widely used CFA/SEM software and is considered to be superior compared to its rivals in terms of standard error calculation and parameter estimation (Byrne, 1998; Vieira, 2011).
2. ***CHECKING SUITABILITY OF DATA FOR THE SEM.*** Prior to model estimation and result evaluation, it is good practice to screen the dataset to establish if the data is suitable for CFA. According to Kline (2011) the following aspects of the data have to be examined:
    - ***COLLINEARITY*** represents extremely high correlation between variables (r>.90) which indicates that the variables are redundant (Kline, 2011; Tabachnik and Fidell, 2007). High collinearity biases the estimated parameters. The key collinearity indicator is the inflation factor (VIF[36]) and Tolerance (TOL[37]). In the context of CFA, thse should be below 10 or above .10 respectively (Kleinbaum et al., 1988).

[35] www.ssicentral.com/lisrel
[36] VIF provides how much variance of an estimated regression coefficient is increased because of collinearity
[37] TOL is reciprocal value of VIF

- ***MISSING DATA*** indicates non response and consequently decreases the usable sample size for the CFA. In the study, there was no missing data.
- ***UNIVARIATE NORMALITY***. Skew and kurtosis are two descriptive indicators that indicate the symmetry and peakness of a variable distribution. In large samples such, as the one in this study, the slightest departures from normality could be statistically significant. In order to prevent wrong inferences due to the sample size, Kline (2011) suggests checking for the normality of the individual variables in the data set by employing skew index ($SI=S^3/(S^2)^{3/2}$) and kurtosis index ($KI=S^4/(S^2)^2-3$) where S^2, S^3, S^4 are respectively the second ($S^2=\sum(X-\mu)^2/N$), third ($S^3=\sum(X-\mu)^3/N$) and fourth moments ($S^4=\sum(X-\mu)^4/N$) about the mean. In large samples SI>3 and KI>10 indicate severe non-normality (Kline, 2011). However, there was no severe non-normality in the data set given that all variables had SI<3 and KI<10 (see Appendix 6).

3. ***MODEL ESTIMATION METHOD.*** Given that the assumption of normally distributed data had been established, the Maximum Likelihood[38] (ML) estimation method was chosen to estimate the model parameters. The goal of the estimation in CFA is to find parameter values that reproduce the observed covariance matrix as closely as possible on a given sample (Kline, 2011). ML is trying to find parameter estimates that, if they were the true population values, would maximize the likelihood that the observed covariance matrix was drawn from that population (Kahn, 2006).

The list of the fit indexes for individual items with their corresponding critical values is given in Table 30.

Table 30: Evaluation criteria for CFA dataset with threshold values

TEST	THRESHOLD VALUES/RULES
VIF	<10
SI	<3
KI	<10

[38] The theory underlying the ML estimation method assumes that data distributions are multivariate normal (Micceri, 1989)

5.3.2.2. CFA the model evaluation criteria

The CFA analysis shows how well a model fits the data by assessing the degree to which the model estimated covariance matrix differs from the observed data covariance matrix (Jöreskog and Sörbom, 1989; Bentler, 1990; MacCallum et al., 1996). Each theory (model) generates its own covariance matrix (Tabachnik and Fidell, 2007). If the model estimated covariance matrix is not statistically different from the observed data covariance matrix, then the model fits the data well and supports the plausibility of the postulated relationships among the variables; otherwise the hypothesised model should be rejected (Wang and Wang, 2012). Testing the model fit is the primary interest of researchers applying CFA. To assess the model fit, numerous fit indices have been developed. Given that only a few model fit indexes are actually reported in real studies (Hu and Bentler, 1999; Kahn, 2006), only those indexes that are considered to be standard in CFA reporting and that do not yield disputes about their usefulness will be reported. Without going into the mathematical computation of each of the fit indexes, their usefulness and existing limitations are briefly explained. However, it is important to note that some of the suggested cut-off criteria for the following fit indexes are general guidelines rather than firm rules (Worthington and Whittaker, 2006).

- ***THE MODEL X^2 STATISTIC*** assesses the magnitude of the discrepancy between the sample covariance matrix and the tested model estimated covariance matrix (Hu and Bentler, 1999). The test's null hypothesis postulates that there is no difference between the model estimated and the observed sample covariance matrices (i.e. the proposed model fits the data). Therefore, to confirm a good model a non-significant χ^2 is expected. Wang and Wang (2012) describe the χ^2 as a badness-of-fit measure in the sense that a large χ^2 corresponds to bad fit, a small χ^2 to good fit, and a χ^2 value of zero indicates a perfect fit. However, χ^2 is defined as n-1 times the fitting function; thus, it is highly sensitive to large sample sizes that render the trivial differences between sample and estimated population covariance matrices significant (Wang and Wang, 2012; Tabachnik and Fidell, 2007). This implies that the larger the sample size, the more likely the model is to be rejected, and thus, the more likely a Type I error is (Russell, 2002). χ^2 is also very sensitive to violations of the assumptions of multivariate normality (Wang and Wang, 2012). Highly skewed and kurtotic variable distributions inflate the χ^2 value (Bentler and Bonett, 1980; Hu and Bentler, 1999;

Wang and Wang, 2012). Finally, χ^2 increases when the number of variables in a model increases. Having said all of this, the significance of the χ^2 test should not be a sufficient reason to reject a model (Wang and Wang, 2012).

- ***ROOT MEAN SQUARE ERROR OF APPROXIMATION (RMSEA)*** is a member of the 'approximate fit indexes' family of quality criteria. RMSEA has become an increasingly used model fit index in applications of SEM/CFA, and simulation studies have shown that RMSEA performs better than other fit indices (Steiger, 1990; Sugawara and MacCallum, 1993). RMSEA estimates the lack of fit in a model compared to a perfect model (Tabachnik and Fidell, 2007). It measures the average error of approximation (lack of fit) per degree of freedom taking the sample size into account (Kline, 2011, Browne and Cudeck, 1993). Unlike the exact fit index, this type of index evaluates the model in terms of how close it fits to the data (Matsunaga, 2010). The values of RMSEA are often interpreted as: 0=perfect fit; <.05=close fit; .05–.08=fair fit; .08–.10=mediocre fit; and>.10=poor fit (Browne and Cudeck, 1993; MacCallum et al., 1996; Byrne, 1998). Marsh, Hau and Wen (2004) suggest that RMSEA≤.08 is acceptable in most cases. Aside from the model χ^2 statistic, RMSEA is the only model fit index so far that can provide a confidence interval (CI) around its calculated value (Tabachnik and Fidell, 2007). RMSEA is generally reported with its 90% CI and in a well-fitting model, the lower 90% confidence limit includes or is close to 0, while the upper limit should be less than .08 (Wang and Wang, 2012).
- ***COMPARATIVE FIT INDEX (CFI)*** belongs to the group of 'incremental fit indexes' or 'relative fit indexes'. Bentler's (1990) CFI compares the specified model with the null model which assumes zero covariances among the observed variables (Wang and Wang, 2012). The CFI is defined as the ratio of improvement in noncentrality (moving from the model with the worst fit to the specified model) to the noncentrality of the null model (Wang and Wang, 2012). Analogous to R^2, CFI=0 indicates the worst fit and CFI=1 indicates the best fit (Wang and Wang, 2012). Traditionally, a desirable CFI is greater than or equal to .95 (Hu and Bentler, 1998, 1999). The CFI is a good fit index even in small samples (Bentler, 1995), however because it is directly proportional to the average size of the correlations in the data (Wang and Wang, 2012), datasets with highly correlated variables will inflate the CFI. Therefore, considering other fit indexes is required.
- ***NORMED FIT INDEX (NFI)*** also belongs to the group of 'incremental fit indexes' or 'relative fit indexes' and evaluates the estimated model by comparing χ^2 value of the

model to the χ^2 value of the null model – the model that corresponds to completely unrelated variables (Tabachnik and Fidell, 2007; Bentler and Bonett, 1980). NFI values greater than .95 indicate a good-fitting model (Hu and Bentler, 1999). The index has been criticised by Bearden, Sharma and Teel (1982) for underestimating model fit in good-fitting models with small samples, but given the large sample size, the NFI index was reported.

- ***NON-NORMED FIT INDEX (NNFI)*** is the NFI index adjusted for the degrees of freedom. Unlike CFI, the NNFI is moderately corrected for parsimony: its value estimates the relative model fit improvement per degree of freedom over the null model (Hoyle and Panter, 1995). Though NNFI tends to run lower than CFI, the recommended cut-off value for the NNFI is the same as for the CFI (Wang and Wang, 2012). As advised by Hu and Bentler (1999) the .95 cut-off was used. While also sensitive to small samples, indicating a poor fit when other indices indicate an adequate fit (Anderson and Gerbing, 1984), given the large sample in this study, this index was assumed to be useful and was reported.
- ***STANDARDIZED ROOT MEAN SQUARE RESIDUAL (SRMR)*** index belongs to the group of 'residual-based indexes'. SRMR is the average value of the standardized residuals between observed and predicted covariances (Bentler, 1995; Tabachnik and Fidell, 2007; Kline, 2011). An SRMR below .08 is considered a good fit (Hu and Bentler, 1999; Kline 2011). Though standardized residuals are not technically a model fit index, they provide useful information about how close the estimated covariances are to those observed. A large standardized residual indicates a large discrepancy in a specific variance or covariance between the observed and obtained variance/covariance matrix.

Multiple fit indices for model evaluation are reported in order to avoid making an inaccurate conclusion about the model fit. The fit indexes discussed above were reported and evaluated against the benchmarks to assess the model fit (see Table 33, 34 and 35). The list of the fit indexes with their corresponding critical values is provided in the Table 31.

Table 31: Evaluation criteria for CB-SEM/CFA models with threshold values

MODEL FIT INDEX	THRESHOLD VALUES/RULES
χ^2	χ^2 close to 0 and insignificant p≥.05
RMSEA	<.08
CFI	>.95
NFI	>.95
NNFI	>.95
SRMR	<.08

5.3.2.3. Scale reliability and validity evidence

An important step in CFA is the review of the psychometric properties of the scales. The scale reliability and validity criteria will be now briefly discussed reported:

- ***INDICATOR RELIABILITY*** examines if sample values of factor loadings are large enough to support the claim that an underlying factor explains an appreciable amount of the variability in the criterion. This test reveals whether appropriate items were assigned to the factors and how well a factor predicts on its observable (Kline, 2011). To confirm the good reliability of an indicator, the factor loading should be relatively strong (λ≥.60), statistically significant (p<.05) and higher than the corresponding error term (λ>δ) (Lloria and Moreno-Luzon, 2014). If not, the indicator should be considered for removal;
- ***COMPOSITE RELIABILITY*** **(CR)** or Raykov's reliability rho (Raykov, 1998) tests if a single common factor underlies a set of variables (unidimensionality test). Raykov (1998) demonstrated that Cronbach's α may provide biased estimates of scale reliability. A scale is generally agreed to have a good composite reliability if CR>.70 (Raykov, 1998, Nunnally, 1994).
- ***CONVERGENT RELIABILITY*** assesses the extent to which a latent variable is well measured by its indicators. It refers to the degree of agreement in two or more measures of the same construct (Yau et al., 2006). Convergent validity exists when a set of indicators measuring the same construct have a strong correlation (Lloria and Moreno-Luzon, 2014; Kline, 2011). Convergent validity is evident when the average variance extracted (AVE) is higher than .50 (Fornell and Larcker, 1981). AVE is a summary measure of convergence among a set of items representing a construct and

represents the average percentage of variation explained among the items (Paswan, 2009);

- ***CRONBACH'S α*** (see Section 5.2.2.2); and
- ***DISCRIMINANT VALIDITY (FORNELL-LARCKER CRITERION)*** is evident when the square root of AVE is greater than the correlations between the observed and other latent variables in the model (Fornell and Larcker, 1981). A scale has discriminant validity when the measurement bears no relationships to other measurements from which the scale should differ, as they should be measuring different concepts (Anderson and Gerbing, 1988). For discriminant validity to be achieved the inter-correlations between different scales should not be too high, preferably below .90 (Kline, 2011).

Table 32 summarises the scale reliability and validity criteria with the adopted threshold levels.

Table 32: Evaluation criteria for scale reliability and validity in CFA with threshold values

TEST	THRESHOLD VALUES/RULES
INDICATOR RELIABILITY	$\lambda \geq .60$ and $\delta < \lambda$
CR	>.70
AVE	>.50
CRONBACH'S α	>.70
FORNELL-LARCKER CRITERION	square root of AVE greater than correlations between the observed and other latent variables in the model and inter-correlations between different scales <.90

5.3.3. CFA findings (Study 4a)

Data was imported into LISREL and a covariance matrix was calculated. The next step was to specify the model in LISREL. This meant that the patterns in which each item loads onto a particular factor had to be specified. Unlike in EFA (which works best when researchers have little idea about how the items are structured) in CFA researchers must have an *a priori* theory on the factor structure underlying the given data (Levine, 2005). In this case the prior knowledge about how items load factors and how many factors there were obtained through EFA. Two separate CFA analyses were run. One with 12 factors, common for both the customer's independent value creation and value co-creation models and the other with COPA (*contribution of participating actors* scale) only. The analyses provided the following results.

For the CFA with 12 factors the χ^2 value was high and the test was significant (p=.000) which indicated that the model and the data did not match well. However, RMSEA was between .06 and .08 indicating fair/acceptable model fit while CFI, NFI and NNFI were all above .95 indicating a good model fit. SMRM was below .08 again indicating that the model fit is good (see Table33, Table 34 and Table 35). All factor loadings on items with their corresponding error terms were significant (p=.000). In each case, factor loadings were above .60 and higher than their error terms, which implied that the items were well crafted/formulated. On the other hand all scales had good internal consistency and reliability scores. Namely CR and Cronbach's α were well above .70 in all of the 12 analysed scales. Furthermore, AVE was, in all cases, above .50 indicating high internal consistency of the scales. Table 35 shows that scales exhibit convergent validity given that the square root of AVE is higher than any correlation coefficient in the coefficients column or the row. This implies that the items assigned to a factor have the highest correlation with the factor they are supposed to measure and that the 12 inherently different/distinctive latent phenomena are identified and successfully measured using the 54 reflective indicators.

In the case of COPA results were also more than satisfactory. The model was saturated and had perfect fit with the data (χ^2=.000 and p=1). Therefore no further fit indexes were considered. All individual items had significant loadings above .60 and significant error terms that were smaller than their corresponding factor loadings. The scale itself also showed

satisfactory validity. CR and Cronbach's α were above .70 while AVE was above .50 (see Table 34).

Therefore the following can be concluded:

- The hypothesised factor models fit the data. The findings from the EFA were confirmed in the CFA;
- The 13 newly developed scales were confirmed to have excellent psychometric properties on two independent samples (UK and USA). The scales are psychometrically sound and generalizable; and
- The task of operationalising reflective, first order latent constructs (scales) was successful.

The next section continues testing the formative measures RESADJ and RESINT.

Table 33: CFA results with model fit indexes

Scale	Items	λ	δ	CR	AVE	α
SKILLS	SKILLS_1	.877	.231	.926	.715	.922
	SKILLS_2	.816	.335			
	SKILLS_3	.735	.460			
	SKILLS_4	.893	.203			
	SKILLS_5	.895	.198			
UCESK	UCESK_1	.847	.282	.919	.790	.918
	UCESK_2	.897	.196			
	UCESK_3	.921	.152			
EQPRF	EQPRF_1	.653	.574	.890	.672	.873
	EQPRF_2	.884	.218			
	EQPRF_3	.920	.154			
	EQPRF_4	.797	.364			
SKEQ	SKEQ_1	.907	.178	.889	.671	.885
	SKEQ_2	.856	.267			
	SKEQ_3	.637	.594			
	SKEQ_4	.838	.298			
COR	COR_1	.731	.465	.926	.715	.925
	COR_2	.824	.321			
	COR_3	.905	.180			
	COR_4	.851	.276			
	COR_5	.903	.185			
RESR	RESR_1	.917	.158	.919	.792	.916
	RESR_2	.943	.111			
	RESR_3	.804	.354			
RESINT	RESINT_1	.748	.441	.822	.609	.887
	RESINT_2	.690	.524			
	RESINT_3	.890	.207			

Note: λ – item loading, δ – error term, CR – composite reliability, AVE – average variance extracted, α – Cronbach's α

Table 33 (continued): CFA results with model fit indexes

Scale	Items	λ	δ	CR	AVE	α
IB	IB_2	.821	.325	.894	.679	.915
	IB_3	.805	.351			
	IB_4	.812	.341			
	IB_5	.855	.268			
EXB	EXB_2	.818	.331	.920	.697	.919
	EXB_3	.822	.324			
	EXB_4	.791	.374			
	EXB_5	.824	.321			
	EXB_6	.915	.163			
SYMB	SYMB_1	.739	.454	.920	.659	.909
	SYMB_2	.772	.403			
	SYMB_3	.843	.289			
	SYMB_4	.746	.443			
	SYMB_5	.863	.255			
	SYMB_6	.894	.202			
SAC	SAC_1	.647	.582	.915	.611	.906
	SAC_3	.628	.606			
	SAC_4	.689	.525			
	SAC_5	.838	.297			
	SAC_6	.895	.200			
	SAC_7	.848	.281			
	SAC_8	.877	.231			
VALUER	VALUER_1	.796	.366	.906	.661	.939
	VALUER_2	.670	.551			
	VALUER_3	.865	.252			
	VALUER_4	.862	.257			
	VALUER_5	.855	.269			
Notes:	All λs and δs are significant at .01 level					
χ^2 = 4,131.326 (p = .000) df = 1,311; RMSEA = .064 with CI (.062 - .066)						
CFI = .970 NFI = .957 NNFI = .968 SRMR = .059						

Table 34: CFA results with model fit indexes for COPA

Scale	Items	λ	δ	CR	AVE	α
COPA	COPA_1	.651[a]	.577[a]	.780	.548	.760
	COPA_2	.656[a]	.570[a]			
	COPA_3	.889[a]	.210[b]			
Notes:	a, b = significance at .01 and .05 level respectively					
χ^2 = .000 (p = 1.000) df = 0; Model was saturated: perfect fit.						

Table 35: CFA correlation matrix with square root of AVE in diagonal

SCALE	CR	AVE	α	SKILLS	UCESK	SKEQ	EQPRF	COR	RESR	RESINT	IB	EXB	SYMB	SAC	VALUER
SKILLS	.926	.715	.922	**.846**											
UCESK	.919	.790	.918	.641[a]	**.889**										
SKEQ	.889	.671	.885	.617[a]	.682[a]	**.819**									
EQPRF	.890	.672	.873	.463[a]	.548[a]	.492[a]	**.820**								
COR	.926	.715	.925	.330[a]	.483[a]	.445[a]	.447[a]	**.846**							
RESR	.919	.792	.916	.312[a]	.462[a]	.461[a]	.455[a]	.627[a]	**.890**						
RESINT	.822	.609	.887	.331[a]	.433[a]	.375[a]	.411[a]	.454[a]	.445[a]	**.780**					
IB	.894	.679	.915	.464[a]	.525[a]	.486[a]	.404[a]	.625[a]	.506[a]	.493[a]	**.824**				
EXB	.920	.697	.919	.301[a]	.318[a]	.285[a]	.280[a]	.469[a]	.313[a]	.408[a]	.629[a]	**.835**			
SYMB	.920	.659	.909	.347[a]	.353[a]	.274[a]	.306[a]	.508[a]	.259[a]	.402[a]	.611[a]	.615[a]	**.812**		
SAC	.915	.611	.906	.036	-.004	-.044	.036	-.064	-.158[a]	-.106[b]	-.077[c]	-.084[c]	.187[a]	**.782**	
VALUER	.906	.661	.939	.319[a]	.364[a]	.303[a]	.371[a]	.427[a]	.296[a]	.391[a]	.583[a]	.731[a]	.676[a]	.079[c]	**.813**
Notes: a, b, c = correlation significant at .01, .05 and .10 level respectively															
$\chi^2 = 4{,}131.326$ (p = .000) with df = 1,311; RMSEA = .064 with CI (.062 - .066) CFI = .970 NFI = .957 NNFI = .968 SRMR = .059															

Note: CR – composite reliability, AVE – average variance extracted, α – Cronbach's α

5.4. Indicator collinearity and external validity tests for indexes (Study 4b)

This section tests statistical properties of formative constructs used in the model of customer's value creation and model of value co-creation.

5.4.1. Indicator collinearity for formative measures

In order to establish if the items assigned to indexes do not have excessive amount of overlapping variance a collinearity test was applied. As shown in Table 36, all of the formative indicators for indexes RESADJ (*resource adjustments*) and SERV (*service*) have TOL>.10 and VIF<10 implying there are no collinearity issues and that both RESADJ and SERV are collection of heterogeneous formative items (Diamantopoulos and Winklhofer, 2001).

Table 36: Collinearity test for RESADJ and SERV with item descriptives

Index	Item	μ	σ	CV	TOL	VIF
RESADJ	RESADJ_1	2.88	1.70	.590	.495	2.019
	RESADJ_2	2.25	1.61	.716	.309	3.233
	RESADJ_3	2.24	1.61	.719	.317	3.159
	RESADJ_4	2.92	1.80	.616	.444	2.251
	RESADJ_5	3.52	1.90	.540	.560	1.787
	RESADJ_6	2.93	1.88	.642	.433	2.311
	RESADJ_7	3.16	1.85	.585	.289	3.459
SERV	SERV_1	5.44	1.24	.228	.432	2.313
	SERV_2	5.61	1.09	.194	.271	3.684
	SERV_3	5.56	1.12	.201	.279	3.584
	SERV_4	5.50	1.18	.215	.373	2.680
	SERV_5	5.53	1.16	.210	.327	3.062
	SERV_6	5.54	1.18	.213	.452	2.210

5.4.2. External validity for formative measures

The external validity test for formative measure requires that each item of the index exhibits a high correlation with one summary statement of the index. For this purpose, a summary statement for both RESADJ and SERV was initially envisaged in the questionnaire. Items were than correlated with the summary statement for their index.

In the case of RESADJ every single formative item was correlated with the Q38 from the Appendix 16. The results shown in Table 37 demonstrate relatively strong and significant correlations (p=.000) of the formative items of RESADJ. Therefore, it can be concluded that the items of RESADJ have demonstrated formative validity.

Table 37: External validity test for RESADJ

Item	r	p	α
RESADJ_1	.563	.000	.01
RESADJ_2	.464	.000	.01
RESADJ_3	.439	.000	.01
RESADJ_4	.560	.000	.01
RESADJ_5	.462	.000	.01
RESADJ_6	.487	.000	.01
RESADJ_7	.626	.000	.01

Note: r – correlation coefficient, p – probability of Type I error, α – significance level

All the items from SERV index exhibit moderate or strong positive correlation with a summary statement provided in Q63 in Appendix 16. The results shown in Table 38 demonstrate relatively strong and significant correlations (p=.000) of the formative items of SERV. Therefore, it can be concluded that the items of SERV have demonstrated formative validity.

Table 38: External validity test for SERV

Item	r	p	α
SERV_1	.625	.000	.01
SERV_2	.553	.000	.01
SERV_3	.590	.000	.01
SERV_4	.630	.000	.01
SERV_5	.660	.000	.01
SERV_6	.608	.000	.01

Note: r – correlation coefficient, p – probability of Type I error, α – significance level

Based on the above provided results the following can be concluded:

- The task of operationalising formative RESADJ and SERV, first order constructs (indexes) was successful. At this stage these two indexes do not need any moderations.
- However, the formative constructs were subject to further examinations given that it is only once they are placed in the nomological networks of specific path models that their true features can be assessed.

Chapter 6 details the PLS-SEM method and presents the model testing procedures and results for the models of customer's independent value creation and value co-creation.

6. Confirmatory research: Testing value creation model via PLS-SEM

When a model is tested, it is actually the theory behind it that is being tested. For this purpose SEM has become a primary choice of marketing scholars (Hair et al., 2014) due to its ability to test complete theories and concepts (Rigdon, 1998) even when the relationships and concepts in the theory are not directly observable (Williams, Vandenberg and Edwards, 2009). SEM, as a 2nd generation multivariate analytical technique, combines factor analysis and multiple linear regressions to enable statistical exploration of the relationships between theory-based latent variables and their indicator variables by directly measuring observable indicator variables (Hair et al., 2014).

There are two families of SEM approaches: covariance based SEM (CB-SEM) and PLS-SEM. Although both SEM families analyse the cause-effect relationships between latent constructs they differ in terms of their underlying assumptions and parameter estimation procedures (Hair et al., 2014; Shook et al., 2004). Namely, CB-SEM aims at reproducing the covariance matrix (minimizing the difference between the observed and estimated covariance matrix), without focusing on explained variance (Hair et al., 2011). Simply said, the primary purpose of CB-SEM is not to explain theoretical phenomena of interest (latent variables) but rather to test how well a particular empirical data fits the model[39] (theory). Therefore, the primary purpose of the CB-SEM is theory confirmation.

On the other hand, PLS-SEM is generally an exploratory technique. Nevertheless, if there is a set of hypotheses stemming from a theory that is subject to PLS-SEM assessment and testing, the PLS-SEM can take a more confirmatory role (Hair et al., 2014). In contrast to CB-SEM, PLS-SEM is based on an ordinary least squares (OLS) estimation method, has the goal to explain the latent constructs' variance by minimizing the error terms and maximizing the R^2 values of the target focal latent constructs (Hair et al., 2014; Ringle et al., 2012). This is achieved by estimating partial model relationships in an iterative sequence of OLS regressions (Hair et al., 2012) thus relaxing the CB-SEM-required multivariate normality (Fornell and Bookstein, 1982; Hwang et al., 2010). According to Hair et al. (2012) being based on a series of OLS regressions, the PLS-SEM has: (a) minimal requirements with the regards

[39] Section 5.3 provides an example of a CB-SEM/CFA study

to sample size[40]; (b) robustness in parameter estimation even when data are highly skewed and/or when indexes are present in the model (Beebe et al., 1998; Cassel et al., 1999; Ringle et al., 2009); (c) high levels of statistical power (Reinartz et al., 2009); and (d) the ability to almost unrestrictedly handle both scales and indexes (Chin, 1998a). Another advantage of the PLS-SEM lies in its ability to calculate latent constructs scores. PLS-SEM estimates latent scores as exact linear combination of the manifest variables associated with a particular latent variable (Fornell and Bookstein, 1982). The estimated latent scores are treated as perfect substitutes for the manifest variables (Hair et al., 2012) of a latent construct and this PLS-SEM feature offers a range of possibilities. For example, the latent scores can be used in subsequent statistical analyses appearing as new variables. Furthermore, latent scores can be used for constructing hierarchical component models/higher order constructs (see Section 6.3.4). In essence, the PLS‑SEM method gives more possibilities to a researcher and can address a broader range of problems than CB‑SEM (Hair et al., 2011).

However, PLS-SEM comes with several disadvantages. The method lacks an adequate global measure of goodness of model fit, which is limiting when it comes to the assessment of alternative path models with a purpose of identifying a better theory representation (Hair et al., 2012). This is partially compensated with the possibility of comparing the R^2 of focal latent constructs. The advantage of the PLS-SEM being a distribution-free method also comes at a cost. Namely, researchers cannot rely on the classic statistical inferential framework (stemming from the central limit theorem) and thus have to revert to resampling procedures (such as bootstrapping[41]) to evaluate the PLS model adequacy (Hair et al., 2012). Furthermore, when it comes to very complex models, PLS-SEM estimated parameters might exhibit a consistency problem, a problem generally referred to as PLS-SEM method bias (Hair et al., 2012). Only with a significantly large number of observations and items per latent variable do the latent variable scores (and thus the estimated parameters) approach the true values (Hair et al., 2012). However, simulation studies show that the differences between CB‑SEM and PLS‑SEM estimates are, in general, miniscule (Reinartz et al., 2009). Namely, given psychometrically sound measures and large samples, both PLS-SEM and CB-SEM yield practically the same results (Tenenhaus, 2008; Reinartz et al., 2009). Thus, the extensively discussed PLS‑SEM bias is often regarded as a minor and practically irrelevant issue

[40] PLS-SEM is known for its ability to provide good parameter estimates using small samples. The '10 times' rule of the minimum required sample size requires the minimal number of observations to be "10 times the maximum number of arrowheads pointing at a latent variable anywhere in the PLS path model" (Hair et al., 2014: 20)

[41] Explained in Section 6.2

(Jöreskog and Wold, 1982) when weighed up against the ability to handle both scales and indexes.

More specifically, the choice of the PLS-SEM for the purpose of model evaluation is based on a number of key arguments:

1. PLS-SEM, as a 2nd generation statistical technique, is particularly effective in explaining maximum variance (R^2) in the phenomena of focal interest. One of the main aims of this study is to check how well the model explains the focal constructs of service and value. Therefore, PLS-SEM was given advantage over CB-SEM.
2. Compared to CB-SEM, PLS-SEM is a more robust approach – it can handle complex models, has fewer identification issues, and works well with small samples (Hair et al., 2011). Given that two models are being tested, the original UK dataset (n=600) had to be split into two subsamples − one made of 449 observations used for the assessment of the customer's value creation model (see Section 6.4), and the other made of 151 observations used to assess the value co-creation model (see Section 6.5). The split distribution was a consequence of the presence/absence of actors other than the camera user. The two sets also had to be further split for the purposes of multi-group comparison study based on customer's perception of their roles in value creation process (see Section 6.6). This led to models based on even smaller samples. Therefore, PLS-SEM as a tool that effectively estimates model parameters on small samples (Reinartz et al., 2009) imposed itself as an adequate solution.
3. A considerable number of formative constructs are present in both the customer's value creation and value co-creation models. Formative constructs are one of the main reasons why researchers choose PLS-SEM over CB-SEM (Hair, Sarstedt, Hopkins and Kuppelwieser, 2014; Hair et al., 2012). Given that PLS-SEM has fewer limitations than CB-SEM in handling formative constructs (Hair et al., 2014) the former came as a primary choice.
4. PLS-SEM is particularly good for building and estimating hierarchical component models – models that include higher order constructs (Lohmöller, 1989). Given that our models have two second order formative constructs, PLS-SEM again appeared as a primary SEM choice.

The next section provides details about the PLS-SEM algorithm.

6.1. The PLS-SEM algorithm

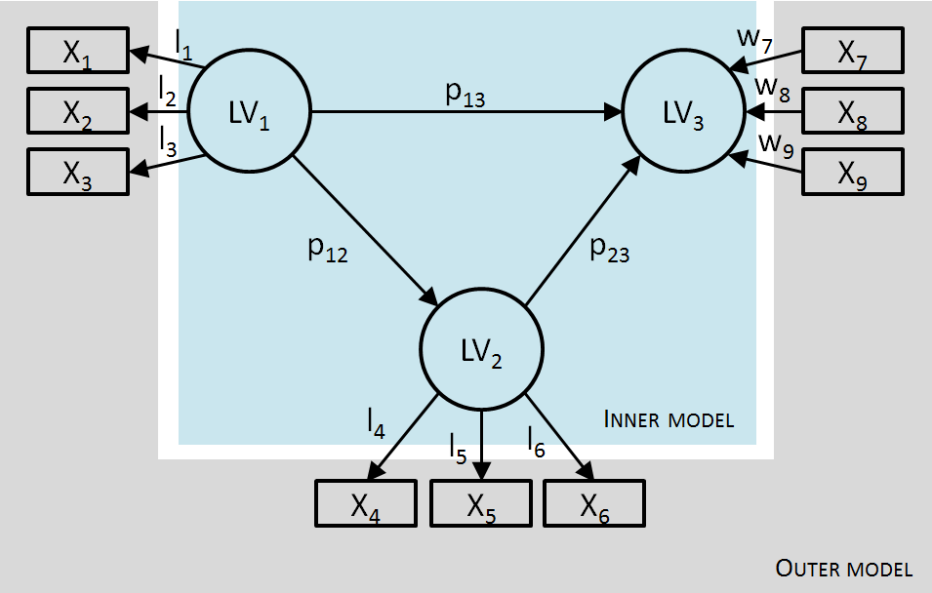
With no intention to delve into the mathematical and statistical underpinnings of the PLS-SEM algorithm, this section descriptively explains the PLS-SEM algorithm principles (the way how model parameters are estimated). For the purpose of illustrating basic concepts of PLS-SEM, a generic path model shown in Figure 6 was used. Any PLS-SEM path model has two components – an *inner model* or *structural model*, which shows the relationships between the latent constructs and an *outer model* or *measurement model* which shows how are the latent constructs measured by the observable proxies (indicators). Since PLS-SEM permits only recursive relationships, the structural paths between latent constructs can only be unidirectional (Hair et al., 2011).

Latent constructs, in the context of PLS-SEM, can be *exogenous, endogenous* or simultaneously *exogenous and endogenous*. Exogenous (independent) latent constructs are predictors that explain other latent constructs in the model (see LV_1 in Figure 6). This implies that no arrow from another latent construct in the model points toward this construct. Rather, arrows can only point from the exogenous to the endogenous construct (for example LV_1 pointing to LV_2 and LV_3). Conversely, an endogenous (dependent) construct is a latent construct that is explained or predicted by other latent constructs via structural model relationships. This means that this construct has arrows coming from other latent constructs (for example LV_3 is explained by LV_1 and LV_2). In special cases, a latent construct can be both endogenous and exogenous at the same time, (for example LV_2 is explained by LV_1, while at the same time explaining LV_3). The relationships between the latent variables, the *path weights* or *inner weights*, are labelled in the example given in Figure 6 with p_{12}, p_{13} and p_{23} and represent fully standardised regression coefficients. Therefore, the size/magnitude of paths weights can be used to establish which exogenous construct is a better predictor of a particular endogenous construct.

The second component of PLS-SEM is the *measurement model* or *outer model*. Building blocks of the outer model are indicators or manifest variables that serve as proxies in measuring latent constructs in the model. Indicators are shown as rectangles labelled as X_1 to X_9. The measurement model includes the unidirectional predictive relationships between

each latent construct and its associated manifest indicators (Hair et al., 2011). One indicator can be associated with only one latent variable at a time[42]. The 6 indicator variables (X_1, X_2, X_3, X_4, X_5 and X_6) for the two latent constructs LV_1 and LV_2 are modelled as reflective measures (arrows points from the construct to the indicators) while the 3 indicators variables X_7, X_8 and X_9 for the latent construct LV_3 are modelled as formative measures (arrows point from the indicators to the construct). In the case of reflective constructs the relationship between the latent and its indicators is measured with outer loadings (labelled as l_1, l_2, l_3, l_4, l_5 and l_6) while in the case of formative constructs the relationship is measured with outer weights (labelled as w_7, w_8 and w_9). As previously said, in the case of a particular reflective constructs indicators are interchangeable within the latent/variable (the reflective latent is causing changes in its indicators) whereas in the case of formative constructs indicators are assumed to explain and cause changes in the latent construct (Diamantopoulos and Winklhofer, 2001).

Figure 6: A generic example of a simple PLS-SEM path model



The PLS-SEM algorithm uses the known elements (indicators) to estimate unknown model elements/parameters (outer loadings, outer weights, path weights, scores of latent variables) (Hair et al., 2014; Lohmöller, 1989). The PLS-SEM algorithm is a four step process that iterates between outer measurement model and inner structural model (Ringle and

[42] Unless the repeated indicator approach is used for the estimation of a higher order constructs (see Section 6.3.4.2)

Henseler, 2011; Hair et al., 2014). According to Hair et al. (2014: 74-77) the PLS-SEM algorithm is a 4 step process that operates on the following principles:

- ***STEP 1 – THE OUTER APPROXIMATION OF LATENT CONSTRUCTS' SCORES.*** The scores of LV_1, LV_2 and LV_3 are computed based on the indicators' scores and the outer coefficients from Step 4. The latent construct scores' outer proxies are computed as linear combinations of the values of all (standardized) indicators associated with a particular latent construct. For example, values of X_1, X_2 and X_3 are used to compute the proxy score for the latent construct LV_1.
- ***STEP 2 – THE ESTIMATION OF PROXIES FOR STRUCTURAL MODEL RELATIONSHIPS OR INNER WEIGHTS.*** In Step 2, the PLS‑SEM algorithm computes proxies for the structural model relationships (p_{12}, p_{23} and p_{13}) using the path weighting schemes that uses combinations of regression analyses and bivariate correlations based on outer latent construct scores as proxies for structural model relationships. This method develops latent construct scores in such a way as to maximize the final R^2 result of the endogenous latent constructs (Lohmöller, 1989).
- ***STEP 3 – THE INNER APPROXIMATION OF LATENT CONSTRUCT SCORES***. In this step the inner proxies of the latent construct scores (LV_1, LV_2 and LV_3) are calculated as linear combinations of their respective adjacent latent construct outer proxies (from Step 1) using the previously determined (Step 2) inner weights.
- ***STEP 4 – THE ESTIMATION OF PROXIES FOR OUTER LOADINGS/WEIGHTS IN THE MEASUREMENT MODELS.*** If a construct is measured reflectively (such as LV_1 and LV_2), then the outer loadings (l_1 to l_6) are calculated as correlations between the inner latent proxy of a latent construct and its indicator variables. If a construct is measured formatively (such as LV_3), than the OLS regression of a latent construct's inner proxy on its indicator variables is applied and the outer weights (w_7, w_8 and w_9) are actually the regression weights obtained in this process.

The four steps are repeated until the sum of changes of the outer weights in two iterations falls below the threshold value of 10^{-5}. In this case the solution is considered to have converged (Hair et al., 2011) and final parameter estimates are obtained. Once parameters are obtained the next step is to assess their significance. This is done using bootstrapping procedure.

6.2. Bootstrapping procedure

Bootstrapping is a resampling technique that draws a large number of random subsamples with replacement from the original dataset (Hair et al., 2014). The technique is based on the assumption that distributions of indicators' scores in the dataset are analogous to their distributions in the focal population (Mooney and Duval, 1993). PLS-SEM does not assume that data are normally distributed and therefore uses bootstrapping as a nonparametric resampling procedure to test coefficients (estimates/parameters) for their significance (Hair et al., 2014). However, the approach is an attempt to emulate the central limit theorem by creating its own distribution of statistic scores without having access to the actual population.

For every sample drawn using bootstrapping, the model is estimated. Based on a large group of estimated models, the procedure determines standard errors and provides *t* values for model parameters (outer weights, outer loadings, path weights). Using the *t* values, as well as bootstrapping confidence intervals for the estimates, a researcher can assess whether a parameter is significantly different from zero.

According to Hair et al. (2014) the rules of thumb for the bootstrapping procedure require the following:

- The number of bootstrap samples should be larger than the number of valid observations in the original sample. However, for the final assessments at least 5,000 bootstrap samples are recommended;
- Each bootstrap sample has to be as large as the original sample;
- Based on the *standard error of the estimated parameter weight* (se) and *estimated parameter weight* (p) the procedure provides *t* scores[43]. The *t* value is calculated as $t=p/se_p$ where p is parameter coefficient and se_p is standard error of parameter p. The obtained *t* scores are than compared to the threshold *t* scores based on the maximum acceptable Type I error probability or statistical significance level (α). For

[43] In general for samples with more than 30 observations the *t* score is a standardised Z score or a number of standard deviations that shows how far or close to the mean an individual score falls

example, for α=.10 a threshold *t*=1.65, for α=.05 *t*=1.96 and for α=.01 *t*=2.57. If the obtained *t* score is higher than the threshold *t* score value, the null hypothesis (parameter being equal to zero) can be rejected. However, a *t* score higher than a predetermined threshold level is only a required but not sufficient precondition for the significance of an estimated parameter coefficient;

- To finally confirm a parameter coefficient is significantly different from 0, the bootstrapping confidence interval should not contain 0. This interval is calculated as $p \pm z_{1-\alpha/2} \times se_p$ (where α represents the maximum acceptable probability of committing a Type I error, $Z_{1-\alpha/2}$ value represents the borderline Z value that established a confidence interval for the predefined α). The bootstrapping confidence intervals are reported alongside with *t* scores; and
- To report *p* value[44] (obtained significance level).

Bootstrapping is a necessary procedure that is applied in a separate step following the PLS-SEM parameter estimation. The next section explains how the PLS-SEM path model is evaluated, explaining all the relevant tests with benchmark/threshold values.

[44] The *p* value is the probability of rejecting the null hypothesis when the hypothesis is true (probability of committing Type I error)

6.3. PLS-SEM path model evaluation procedure

Following the estimation of the model using the PLS algorithm, the obtained parameters are subject to a series of examinations. According to Hair et al. (2014) in order to fully assess and evaluate a path model, the PLS-SEM requires:

1. ***EVALUATION OF MEASUREMENT MODELS*** (a compulsory first step to evaluate and assess the outer model);
2. ***EVALUATION OF STRUCTURAL MODEL*** (a compulsory second step to evaluate and assess the inner model); and
3. ***ADVANCED EVALUATIONS*** (an optional step that is followed only if there is at least one of the following in the model: mediation effect, moderation effects and/or a higher order construct).

The next 3 sections elaborate each of these evaluations.

6.3.1. Evaluation of measurement models

The evaluation of measurement models procedures assess whether latent variables (constructs) are measured using psychometrically sound measures. Even though the first order scales and indexes were previously evaluated in the Chapter 5, the evaluation of both reflective measurement models (scales) and formative measurement models (indexes) has to be performed again in the PLS-SEM for each of the models for the following reasons:

- The PLS-SEM studies are using the same sample used for the CFA. However, the sample had to be split in two subsamples given that two different types of camera usage setting were distinguished: (1) usage episodes where customers were alone and had no interaction with other actors (case of *customer's value creation*, n=449); and (2) usage episodes where customer interacted with other actors in order to capture their photographs (case of *value co-creation*, n=151). Given that the original sample was split, a new series of tests for scales and indexes were needed;
- Unlike in CFA, both scales and indexes are now simultaneously placed into nomological networks. This particularly influences formative constructs, given that they obtain their meaning through nomological networks, and can behave differently

in different structural settings (Kim, Shin and Grover, 2010). Being placed in a structure that reflects a postulated theory, measurement models *per se* require additional verification; and

- Both the *customer's value creation* and *value co-creation* path models contain two higher order formative constructs (VALUE and RES). Given that higher order constructs could not be previously tested and estimated due to the limitations of the available first generation statistical methods, it was necessary to verify their reliability and validity via PLS-SEM following the same principles of evaluation of the first order measurement models.

The evaluation of the measurement models in the PLS-SEM consist of the:

1. Evaluation of reflective measurement models (scales); and
2. Evaluation of formative measurement models (indexes).

6.3.1.1. Evaluation of the reflective measurement models

Scale evaluation follows an almost identical set of principles and rules of thumb established in the Chapter 5. Therefore, only the differing aspects relevant to the PLS-SEM context from the list of the tests for the evaluation of reflective measurement models will be added and explained. For the purpose of evaluating scales, Hair et al. (2014) suggest the following set of tests be applied:

- **CONVERGENT VALIDITY**:
  - ***INDICATOR RELIABILITY AND INDICATOR LOADING***. The indicators outer loadings should be statistically significant and above .70 in magnitude (Hair et al., 2014). However, "[the] indicators with outer loadings between .40 and .70 should be considered for removal from the scale only when deleting the indicator leads to an increase in the CR or AVE above the suggested threshold values" (Hair et al., 2014: 103). Indicators with loading below .40 should always be removed from the scale (Hair et al., 2011). To consider an indicator as reliable, the underlying scale should explain more than half of indicators variance (indicator reliability >.50).
  - ***AVERAGE VARIANCE EXTRACTED*** **(AVE)**

- **INTERNAL CONSISTENCY**:
  - ***COMPOSITE RELIABILITY*** **(CR)**
  - ***CRONBACH'S*** α
- **DISCRIMINANT VALIDITY**:
  - ***FORNELL-LARCKER CRITERION***
  - ***CROSS-LOADINGS***. An indicator's outer loading on the associated construct should be greater than all of its loadings on the other constructs present in the model (i.e. the cross loadings) (Hair et al., 2014). Otherwise there is a discriminant validity problem and the indicator should be either removed or reassigned to another scale.

The summary of the tests for the evaluation of scales along with the adopted threshold values/rules are provided in Table 39.

Table 39: Evaluation criteria for scales (in PLS-SEM) with threshold values

TEST	THRESHOLD VALUES/RULES
INDICATOR LOADING	l≥.70 and statistically significant; .40< l<.70 acceptable if removal of item does not lead to an increase in CR or AVE above threshold values
INDICATOR RELIABILITY	>.50
AVE	>.50
CR	>.70
CRONBACH'S α	>.70
FORNELL-LARCKER CRITERION	square root of AVE > than correlations between the observed and other latent variables; inter-correlations between different scales <.90
CROSS-LOADINGS	an item should have the highest loading on the scale it was originally assigned to

6.3.1.2. Evaluation of the formative measurement models

In contrast to the index evaluation approach proposed by Diamantopoulos and Winklhofer (2001), the PLS-SEM employs a wider range of tests. According to Hair et al. (2014) the evaluation of formative measurement models (indexes) consists of three groups of tests:

- ***CONVERGENT VALIDITY OR REDUNDANCY ANALYSIS*****.** Convergent validity is the extent to which a measure correlates positively with other measures of the same construct (Chin, 1998a). This implies that for each index used in the model there should be an alternative scale so that the redundancy test can be performed (for this purpose

both multi-item and one-item scales are acceptable). The strength of the path coefficient linking the redundant constructs should be strong and preferably above .80 (Chin, 1998a). However, in the case of HOCs that contain extremely heterogeneous components (such as RES in our case) it is hard to expect to find reflective measures for the redundancy analysis that would perform at that level (Wetzels et al., 2009). Therefore, a more liberal approach of .70 is suggested, which would imply that a formative measurement model explains at least 50% of the variance of its redundant reflective measurement model.

- ***COLLINEARITY AMONG FORMATIVE INDICATORS.*** As explained previously, formative indicators are not interchangeable. Therefore, high correlations between items (collinearity) boost standard errors and can cause problems such as biased, insignificant or reversed-signed outer weights (Hair et al., 2014). In the context of PLS-SEM, two indicators of collinearity are observed:
    - ***TOLERANCE (TOL)*** should be above .20 (Hair et al., 2011).
    - ***VARIANCE INFLATION FACTOR (VIF)*** should be below 5 otherwise the formative measurement model should be dismissed (Hair et al., 2011).
- ***SIGNIFICANCE AND RELEVANCE OF OUTER WEIGHTS – RELATIVE AND ABSOLUTE IMPORTANCE OF FORMATIVE INDICATORS*** (based on Hair et al., 2014: 126-138)**.** A formative indicator is assessed according to the magnitude and significance of its outer weights (w). "The outer weight is the result of a multiple regression with latent variable scores as the dependent variable and the formative indicators as the independent variables" (Hair et al., 2014: 126). Given that PLS-SEM assumes formative indicators to be error free, the indicators explain total variance of the latent score. Being products of multiple regressions, outer weights are fully standardised regression coefficients and can be directly compared so that each indicator's relative importance is determined (Hair et al., 2014). An important step in the assessments is testing the outer weight statistical significance (testing if the outer weight is significantly different from zero). This is done through the bootstrapping procedure. The obtained empirical *t* value should be higher than the critical/threshold *t* value and the confidence interval (CI) for the estimated weight coefficient should not contain 0. Only in this case can the weight be argued to be significantly different from 0. If the weight coefficient is significant, the actual formative indicator has *relative importance*. If the weight appears to be non-significant, the corresponding indicator should not be immediately dismissed, but rather the formative indicator's absolute contribution or *absolute importance*

should be considered (Hair et al., 2014). The absolute contribution is given by a formative indicator's outer loading. When an indicator's outer weight is insignificant but its outer loading is high (>.50) the indicator should be interpreted as absolutely important but not as relatively important. In this situation the indicator would generally be retained. Otherwise, the indicator should be dismissed unless there is a strong theoretical support for the indicator to be retained as a part of the index.

Table 40: Evaluation criteria for indexes (in PLS-SEM) with threshold values

TEST	THRESHOLD VALUES/RULES
REDUNDANCY ANALYSIS	>.70 preferably >.80
TOL	>.20
VIF	<5
RELATIVE IMPORTANCE OF FORMATIVE INDICATOR	*t*>1.65 for α=.10; *t*>1.96 for α=.05; *t*>1.257 for α=.01; and bootstrap CI does not include 0. If none is satisfied check for the absolute importance.
ABSOLUTE IMPORTANCE OF FORMATIVE INDICATOR	l>.50 (otherwise dismiss)

6.3.2. Evaluation of the structural model

The assessment of the structural model in PLS-SEM enables researchers to determine how well the empirical data supports the proposed model and how well the model explains the key concepts of interest. For this purpose the model path weights and R^2 values of the focal constructs are examined first. The assessment of the PLS-SEM structural model can only begin once the construct measures are confirmed to be reliable and valid. It is worth noticing that unlike in CB-SEM, PLS-SEM does not provide an overall goodness of model fit. Rather, the model is assumed to be specified correctly and is assessed in terms of how well it predicts the endogenous variables/constructs (Rigdon, 2012).

According to Hair et al. (2014: 167–179[45]) the steps of PLS-SEM structural model results assessment are:

- ***ASSESSING STRUCTURAL MODEL FOR COLLINEARITY ISSUES.*** PLS-SEM requires that all sets of exogenous constructs, predictors to each of the endogenous latent constructs

[45] This section relies on Hair et al. (2014) PLS-SEM book given that it is the most current and widely accepted guideline on PLS-SEM method

undergo collinearity assessment. Given that prediction/explanation of an endogenous construct is performed based on the multiple regressions that includes latent scores of exogenous constructs (predictors of the endogenous), potential collinearity between predictors (that are expected to be independent) can bias path coefficients. For this analysis the scores of latent constructs are needed, and the sets of predictors are evaluated for TOL and VIF according to the thresholds mentioned before (TOL>.20 and VIF<5).

- ***ASSESSING THE SIGNIFICANCE AND RELEVANCE OF THE STRUCTURAL MODEL RELATIONSHIPS.*** The execution of the PLS-SEM algorithm provides the researcher with the path coefficients that represent fully standardised regression coefficients (path weights). This implies they can take values from -1 to +1 thus explaining the nature and strength and the magnitude of the hypothesized relationships between two latent constructs. The bigger the magnitude of the path the more likely that the path is statistically significant (i.e. different from zero in the population). For the purpose of testing whether a path coefficient differs from 0 in the population the procedure of bootstrapping has to be applied. However, the relationship between two latent variables should not only be significant but relevant as well. Given that paths pointing to one latent variable are described by full standardised regression coefficients, the paths could be directly compared and predictors could be ranked according to their relevance (the higher the path coefficient the more relevant its predictor latent variable – the more variance of the endogenous variable it explains). It is, therefore required, that researchers report path coefficients, both *t* and *p* values along with the bootstrap confidence interval for the predefined significance level α.
- ***ASSESSING THE LEVEL OF EXPLAINED VARIANCE (R^2).*** The R^2 is the amount of variance in the endogenous latent variable explained by the exogenous latent variables linked to it. The R^2 coefficient is a measure of the model's predictive accuracy and is calculated as the squared correlation between the specific endogenous construct's actual and predicted values. It can range from 0 to 1 with higher levels indicating higher levels of predictive accuracy. However, it is difficult to provide rules of thumb for acceptable R^2 values as this depends on the model complexity and research discipline. Whereas R^2 values of .20 are considered high in disciplines such as customer behaviour, in scholarly research focused on marketing issues, R^2 values of .75, .50 or .25 for endogenous latent variables can be respectively described as

substantial, moderate or weak (Hair et al., 2011; Henseler, Ringle and Sinkovics, 2009). Good models have endogenous variables with few predictors (2–3) and a high amount of explained variance. Such models are called parsimonious models. Adjusted R^2_{adj} takes into account model complexity and adjusts the R^2 accordingly and is useful for comparing the predictive ability of alternative PLS-SEM models.

- ***Assessing the effect sizes (f^2).*** In addition to evaluating the R^2 for all endogenous constructs, the change in the R^2 when a specified exogenous construct is omitted from the model can be used to evaluate the extent to which the omitted construct impacts the endogenous constructs. This measure is referred to as the f^2 effect size. The effect size can be calculated as $f^2=(R^2_{included}-R^2_{excluded})/(1-R^2_{included})$. Where $R^2_{included}$ and $R^2_{excluded}$ are the R^2 values of the endogenous latent variable when a selected exogenous latent variable is, respectively, included in or excluded from the model. The change in the R^2 value is calculated by estimating the PLS path model twice (before and after the exclusion of the particular latent variable for which f^2 is being calculated). f^2 of .02, .15 and .35 respectively represent small, medium and large impact effects on the exogenous latent variable (Cohen, 1988).

A summary of the tests for the evaluation of structural models is provided in Table 41.

Table 41: Evaluation criteria for the structural model (in PLS-SEM) with threshold values

Test	Threshold values/Rules
Collinearity	TOL>.20 and VIF<5 for the each group of exogenous constructs explaining corresponding endogenous constructs
Path weight significance	See bootstrapping procedure in Section 6.2
R^2	.25 (weak), .50 (moderate) and .75 (substantial)
f^2	.02 (small), .15 (medium) and .35 (large)

6.3.3. Advanced evaluations: mediation effect

Mediation effect, as an advanced PLS-SEM issue, requires a separate test procedure to confirm/reject if the mediation effect between two latent variables in the model actually exists. The simple cause-effect relationship between two latent variables implies that an independent latent variable directly affects dependent latent variable without any other systematic influences (Ringle and Henseler, 2011). However, in practice a relationship

between two latent variables is usually more complex – i.e. mediated by one or more latent variables. A mediating effect exists when one latent variable intervenes between two other related latent variables (Hair et al., 2014). According to Hair et al. (2014: 36) "from a theoretical perspective the most common application of mediation is to explain why a relationship between an exogenous and endogenous construct exists".

An illustration of a mediation effect is shown in the Figure 6. The p_{13} path or direct effect between LV_1 and LV_3 is a single path represented with one arrow pointing from LV_1 to LV_3. Additionally there is a mediation or indirect effect that goes through LV_2 (mediation variable) using paths p_{12} and p_{23}. This is an indirect effect or compound path represented with two arrows – one from LV_1 to LV_2 and the other from LV_2 to LV_3. According to Baron and Kenny (1986) LV_2 functions as a mediator when it meets the following conditions (Baron and Kenny, 1986):

- LV_1 explains a significant portion of the variance in the mediator variable LV_2 (path p_{12});
- LV_2 explains a significant portion of the variance the dependent variable LV_3 (path p_{23}); and
- When paths p_{12} and p_{23} are controlled, a previously significant p_{13} changes its value significantly.

To test for mediation effect, Holmbeck (1997) and Preacher and Hayes (2008) recommend that models should be estimated twice. The first estimation includes the proposed mediators, the other does not. In both cases the *t* scores are calculated, and path weight significance levels are obtained through bootstrapping. According to Hair et al. (2014: 223–225) the results of the mediation test must answer the following questions based on the obtained parameters:

- Is the direct effect p_{13} still significant when the mediator variable is excluded from the PLS path model?
- Is the mediation effect $p_{12} \times p_{23}$ (i.e. the effect via mediator variable) significant after the mediation variable has been included in the PLS-SEM path model? A necessary (but not sufficient) condition for the significance of the product path $p_{12} \times p_{23}$ is that the two paths themselves are both significant. If the $p_{12} \times p_{23}$ is non-significant there is no mediation.

- How much of the direct effect p_{13} does the indirect effect (i.e. $p_{12} \times p_{23}$) absorb? Has the p_{13} path remained significant following the inclusions of mediator variable? If $p_{12} \times p_{23}$ is significant while p_{13} is insignificant, then a full mediation has occurred. If both $p_{12} \times p_{23}$ and p_{13} are significant, then there is only partial mediation is place. Also if the mediation exists then the 'variance accounted for mediation' (VAF) is calculated for the purpose of explaining how much of the direct effect has the indirect effect absorbed. The VAF is calculated as $VAF=(p_{12} \times p_{23})/(p_{12} \times p_{13} + p_{13})$. A rule of thumb proposed by Hair et al. (2014) says that if VAF>80% there is a full mediation, if 20%≤VAF≤80%, there is a partial mediation, and if VAF<20% there is no mediation of practical importance.

6.3.4. Advanced evaluations: higher order constructs

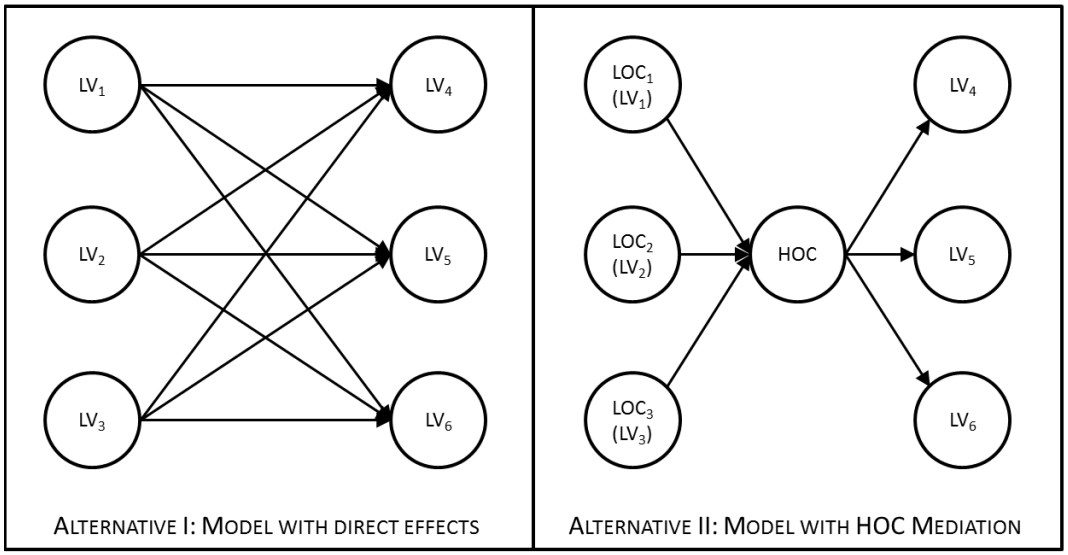
A higher-order construct (hierarchical latent construct or hierarchical component model) is an overall abstraction (a summary) of a group of constructs that are, according to the theory, related to each at a higher level of abstraction (Law, Wong and Mobley, 1998). A HOC, therefore, consists of a group of underlying dimensions – first order latent variables or lower order constructs (LOCs) that are summarized and represented using a singular (higher order) construct (Netemeyer et al., 2003). A latent construct is not inherently multidimensional or unidimensional, but can be operationalised in one way or the other, representing different levels of theoretical abstraction (Law et al., 1998; Becker et al., 2012). Therefore, the relation between HOC and the LOCs is not a question of causality, but rather a question of the HOC's definition and underlying theory (Becker et al., 2012).

As shown in Figure 7, when present in the model, a HOC completely mediates the interaction of its underlying dimensions (LOCs) and other latent constructs in the model that are related to the corresponding HOC (Chin, 1998b). The existence of the HOC in the model contributes to the model parsimony given that HOCs reduce the density of the network of relationships (causations)[46], and in certain cases reduces the number of latent constructs present in the model (in the case of the two-stage hierarchical component model estimation that will be

[46] For example in the Figure 7, once the HOC was introduced in the model, the number of relationships decreased from 9 (Alternative I) to 6 (Alternative II)

explained later in this section). Like any other latent construct, a HOC can be either formative or reflective (Becker et al., 2012). This depends on the relationships between the HOC and its LOCs. A reflective HOC is manifested by LOCs, while a formative HOC is made of LOCs (Edwards, 2001; Wetzels et al., 2009).

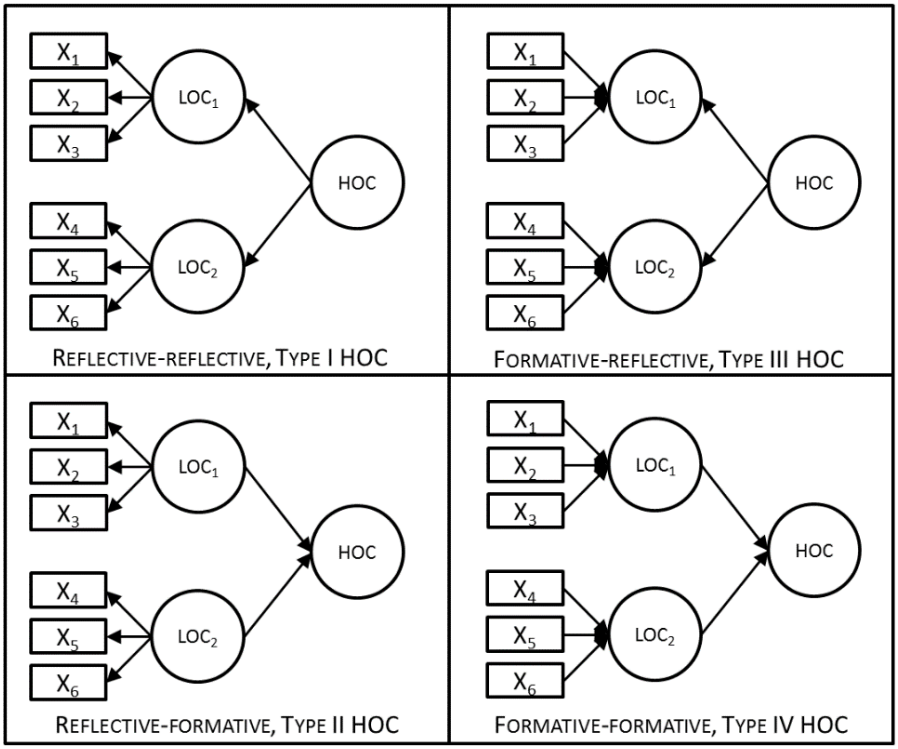
Figure 7: PLS-SEM path models with and without HOC



Source: Hair et al. (2014)

Focusing on a 2nd order hierarchical latent variable models, Hair et al. (2014) have distinguished four types of hierarchical component models based on the relationships between: (1) LOCs and their manifest variables; and (2) the HOC and its LOCs (see Figure 8).

Figure 8: Types of the 2nd order hierarchical component models



Source: Hair et al. (2014)

Advocates of the application of HOCs in PLS-SEM argue that the presence of HOCs in the path model allows theoretical parsimony and reduced model complexity (Edwards, 2001; Law et al., 1998; MacKenzie et al., 2005). On the other hand Gorusch (1983) argues that HOCs can reduce accuracy for the benefit of an increase in the breadth of generalization. This is particularly relevant for HOCs that consist of highly heterogeneous sub-dimensions. However, any application of HOCs requires theoretical justification. Furthermore, it is the theory that dictates how the HOC is specified, how many sub-dimensions it has and what the relationship is between the LOCs and the HOC (Johnson et al., 2012; Polites et al., 2012).

Given that both models being tested contain HOCs that hold a central place in the model, the theoretical rationales for the presence of HOCs will be provided in the section that follows.

6.3.4.1. Theoretical justification for the presence of HOC in the value creation model

RESOURCES (RES) AS A FORMATIVE HOC. Resources are one of the theoretical pillars of SDL/SL. According to Vargo (2008) operant resources (customer knowledge and skills, applied knowledge and skills of the service provider, operant resources contained in the product etc.) are used in the process of consumption to (co-)create service/value. Operant resources act upon and transform operand resources. The latter are generally being given an insignificant role in SDL/SL literatures (i.e. see explanation of the FP1 in Table 4). The quantitative studies in this doctoral research build further on the work of Vargo (2008) and Vargo and Lusch (2008a) and are also based on the findings of the qualitative research phase which highlighted both operant and operand resources and their role in service and value creation.

Finally, RES as an exogenous formative HOC was confirmed to be theoretically sound through three rounds of expert interviews. In this case, RES consists of customer knowledge (in particular knowledge related to the requirements of the usage episode – UCESK and knowledge related to the equipment used – SKEQ), customers skills (SKILLS), the equipment performance (EQPRF), the contextual resources (COR) and finally the contribution of participating actors in the cases when they are present in the camera usage episode (COPA). While the primary role of operant resources is in no way disputed, this research also includes operand resources (in this particular research context of camera usage: light, scenery, ambiance etc.).

VALUE (VALUE) AS A FORMATIVE HOC. There is extensive evidence that value can be regarded and conceptualised as a multidimensional/multicomponent higher order construct. For example, Mathwick et al. (2001, 2002) framed an experiential value concept to represent a fourth-order, reflective, hierarchical construct model that consists of intrinsic (hedonic) value and extrinsic (utilitarian) value as underlying components. Trueman et al. (2012) formulated online brand value as a higher order reflective-formative construct. Smith and Colgate (2007) formulated four dimensions of value: functional/instrumental value, experiential/hedonic value, symbolic/expressive value and cost/sacrifice value. Sweeney and Soutar (2001) also formulated value as a multidimensional construct consisting of: emotional value, social value, quality value and price value (sacrifice). Mohd-Any et al. (2014) also support customer

perceived e-value (value in an online context) as a multidimensional construct consisting of utilitarian value, emotional value, social value, perceived control of freedom, value for money and users cognitive effort. Evidentially, there is a range of publications that operationalise value as a HOC. The approach in this study was consistent with Smith and Colgate's (2007) very detailed value inventory conceptualisation. Therefore, in our case VALUE is defined as a HOC consisting of instrumental benefits (IB), experiential benefits (EXB), symbolic benefits (SYMB) and sacrifices (SAC). Finally, VALUE, as an endogenous formative HOC, was confirmed to be well defined through the three rounds of expert interviews.

6.3.4.2. Estimating parameters in hierarchical latent variable models using PLS-SEM

PLS-SEM requires the computation of construct scores for each latent variable in the path model (Becker et al., 2012). Since the observed variables (or indicators) used to estimate the construct scores of a HOC do not exist, the estimation of the parameters of the hierarchical latent variable models requires approaches that are different from those applied for the path models solely made of first order constructs (Becker et al., 2012). According to Becker et al. (2012) the two most popular approaches for the estimation of the parameters of hierarchical latent variable models using PLS-SEM are:

- ***REPEATED INDICATOR APPROACH*** (Lohmöller, 1989; Wold, 1982); and
- ***SEQUENTIAL LATENT VARIABLE SCORE METHOD* OR *TWO-STAGE APPROACH*** (Ringle et al., 2012; Wetzels et al., 2009).

For the repeated indicator approach, a HOC can be constructed by having manifest variables of underlying LOCs assigned to it in either a formative or reflective measurement mode (Hair et al., 2014). For example, if a second-order HOC consists of two underlying first order LOCs, each with three manifest variables, the second-order HOC can be specified using all six manifest variables of the underlying first-order LOCs (Becker et al., 2012). This implies that some indicators are used twice in the model: for the first-order LOCs ('primary' loadings/weights) and for the second-order HOC ('secondary' loadings/weights) (Wetzels et al., 2009; Becker et al., 2012). Having specified the measurement model in this way, the structural model accounts for the hierarchical component of the model, as the path coefficients between the HOC and LOCs represent the loadings/weights of the HOC (Wetzels

et al., 2009; Becker et al., 2012). The two-stage approach estimates the construct scores of the first-order constructs (LOCs) in a first-stage model without the second-order construct (HOC) present, and subsequently uses these LOCs' scores as indicators for the HOC in a separate second-stage analysis (Wetzels et al., 2009; Wilson and Henseler, 2007; Becker et al., 2012). Thus, latent scores from the first stage model estimation in which the HOC was not present, become indicators of the HOC in the second-stage model estimation.

The repeated indicator approach has the advantage of estimating all constructs simultaneously instead of the separate estimation of lower-order and higher-order constructs (Becker et al., 2012). Thus, the entire nomological network is taken into account which prevents potential interpretational confounding (Wilson and Henseler, 2007). However, the repeated indicators approach comes with several pitfalls. First, the repeated indicator approach is only advisable if the LOCs have an equal number of indicators (Hair et al., 2014; Becker et al., 2012). Namely, if the number of indicators across the LOCs is not balanced the estimated relationships between the HOC and the LOCs may be biased (Becker et al., 2012). Second, when the repeated indicator approach is used and the HOC is formative and endogenous (i.e., reflective-formative or formative-formative) the path weights coming from its predictor latent variables are 0 and insignificant (Hair et al., 2014). This is due to the fact that the LOCs already explain the total variance of the HOC (Wetzels et al., 2009). In this case other antecedent constructs (predictors) cannot explain any variance of the HOC unless a two-step approach is applied (Ringle et al., 2012; Wetzels et al., 2009). Therefore, Ringle et al. (2012) suggest using the two-stage approach whenever the PLS-SEM model involves a formative endogenous HOC .

In the light of the above discussion, the two-step approach was selected for the estimation of the parameters of both of the models (customer's value creation and value co-creation) for the following reasons:

- The examined models had two HOCs (RES and VALUE) with VALUE as a formative endogenous HOC;
- the number of indicators across LOCs under both of the HOCs in the model were uneven (for example among the LOCs of VALUE, SAC had 7 indicators while IB had only 4);
- a repeated indicator approach would inflate the minimal sample size requirements especially in the case of the value co-creation model (following the '10 times rule'

and formative measurement mode of HOCs, at least 210 observations would have been needed);

- a two-step approach enabled more parsimony in the PLS-SEM path models;

This required the models of customer's value creation and value co-creation to be estimated twice using the two-step procedure. In the first step, the assessment and purification of the first order latent constructs was performed. Once the first order constructs were confirmed to have sound psychometric properties in nomological network, the latent scores of the latent variables representing LOCs were obtained and were used in the second step to build HOCs. In the second step, HOCs were constructed using the scores of their corresponding first order constructs as indicators. The model was then evaluated following the full procedure as described in the previous sections. Finally, the same measurement evaluation procedure applicable to the first order constructs was applied to evaluate the HOCs (Hair et al., 2014).

6.4. Testing the model of customer's value creation (Study 4c)

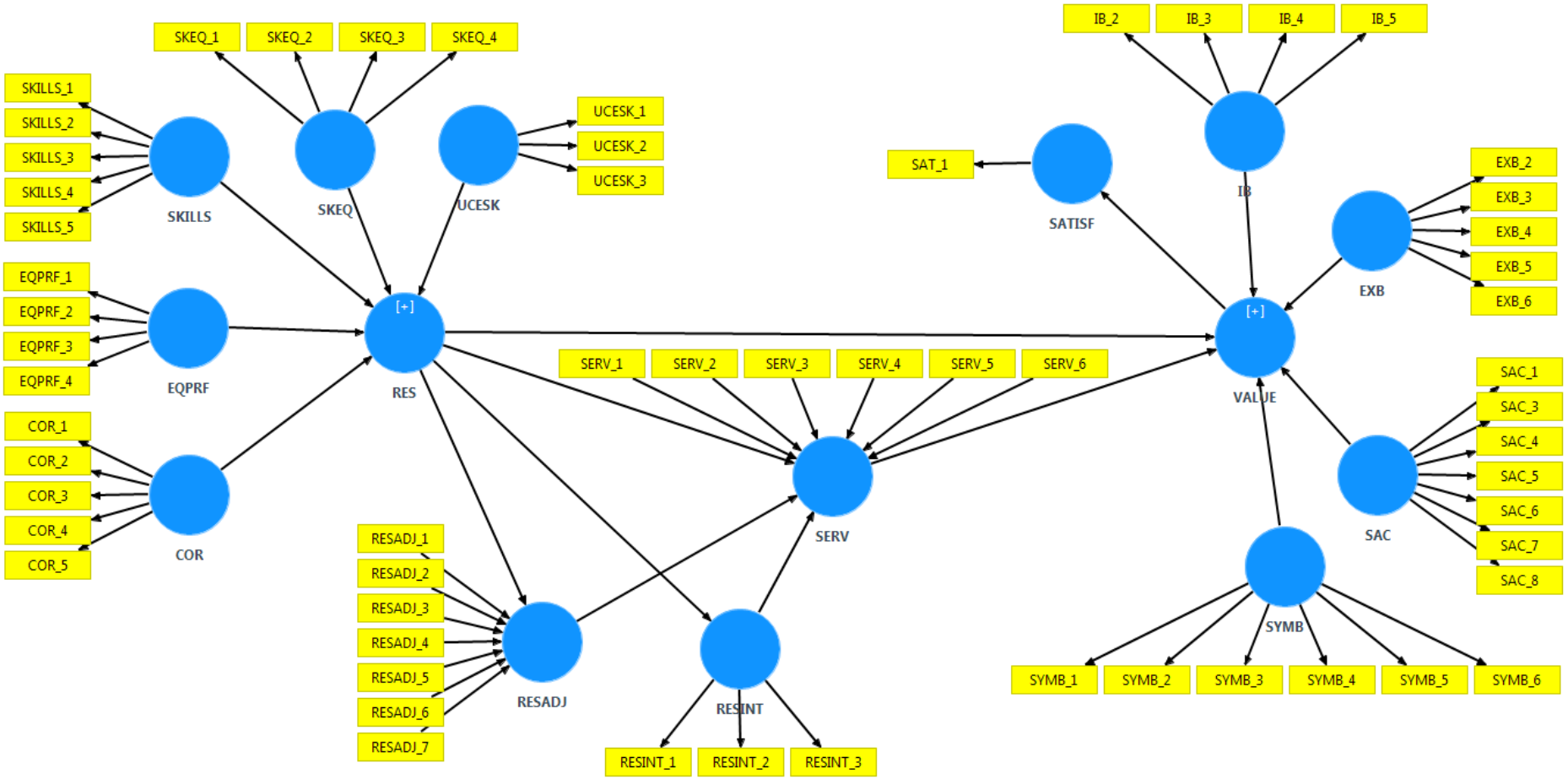
Based on the conceptual structural quantitative model of value creation shown in Figure 4, and the focal research questions (RQ_1, RQ_2 and RQ_3), 8 hypotheses were proposed (see Table 42).

Table 42: Structural theory for the customer's value creation path model – hypotheses

H_1	THE BETTER THE RESOURCE PORTFOLIO EMPLOYED IN USE, THE BETTER THE SERVICE CREATED. (RES→SERV)
H_2	THE MORE RESOURCE ADJUSTMENTS ARE PERFORMED THE BETTER THE SERVICE CREATED. RESOURCE ADJUSTMENT IS A TRANSFORMATIVE PROCESS THAT RESOURCES UNDERGO DURING THE PROCESS OF SERVICE CREATION. (RES→RESADJ→SERV)
H_3	RESOURCE INTEGRATION IS A TRANSFORMATIVE PROCESS THAT RESOURCES UNDERGO DURING THE PROCESS OF SERVICE CREATION. (RES→RESINT→SERV)
H_4	THE BETTER THE EMPLOYMENT OF RESOURCES INTO SERVICE, THE HIGHER THE EPISODIC VALUE CREATED. (SERV→VALUE)
H_5	THE HIGHER THE VALUE CREATED, THE HIGHER THE CUSTOMER'S SATISFACTION OF THE CUSTOMER WITH THE SERVICE CREATED. (VALUE→SAT)
H_6	SERVICE CREATION IS A PROCESS NESTED IN THE PROCESS OF VALUE CREATION. SERVICE MEDIATES THE TRANSFORMATION OF RESOURCES INTO VALUE. (RES→SERV→VALUE)
H_7	THE PORTFOLIO OF RESOURCES (RES) IN THE CONTEXT OF CUSTOMER'S VALUE CREATION CONSISTS OF CUSTOMER KNOWLEDGE (UCESK, SKEQ), CUSTOMER SKILLS (SKILLS), CONTEXTUAL RESOURCES (COR) AND THE EQUIPMENT USED (EQPRF).
H_8	VALUE IN THE CONTEXT OF VALUE CREATION IS A MIX OF EXPERIENTIAL BENEFITS (EXB), INSTRUMENTAL BENEFITS (IB), SYMBOLIC BENEFITS (SYMB) AND SACRIFICES (SAC).

Based on the structural theory (in Table 42), and the measurement theory (indexes and scales) developed in Chapter 5, the initial PLS-SEM path model of customer's value creation was created in the Smart-PLS version 3.1.6 (Ringle et al., 2014) – see Figure 9.

Figure 9: Initial customer's value creation path model



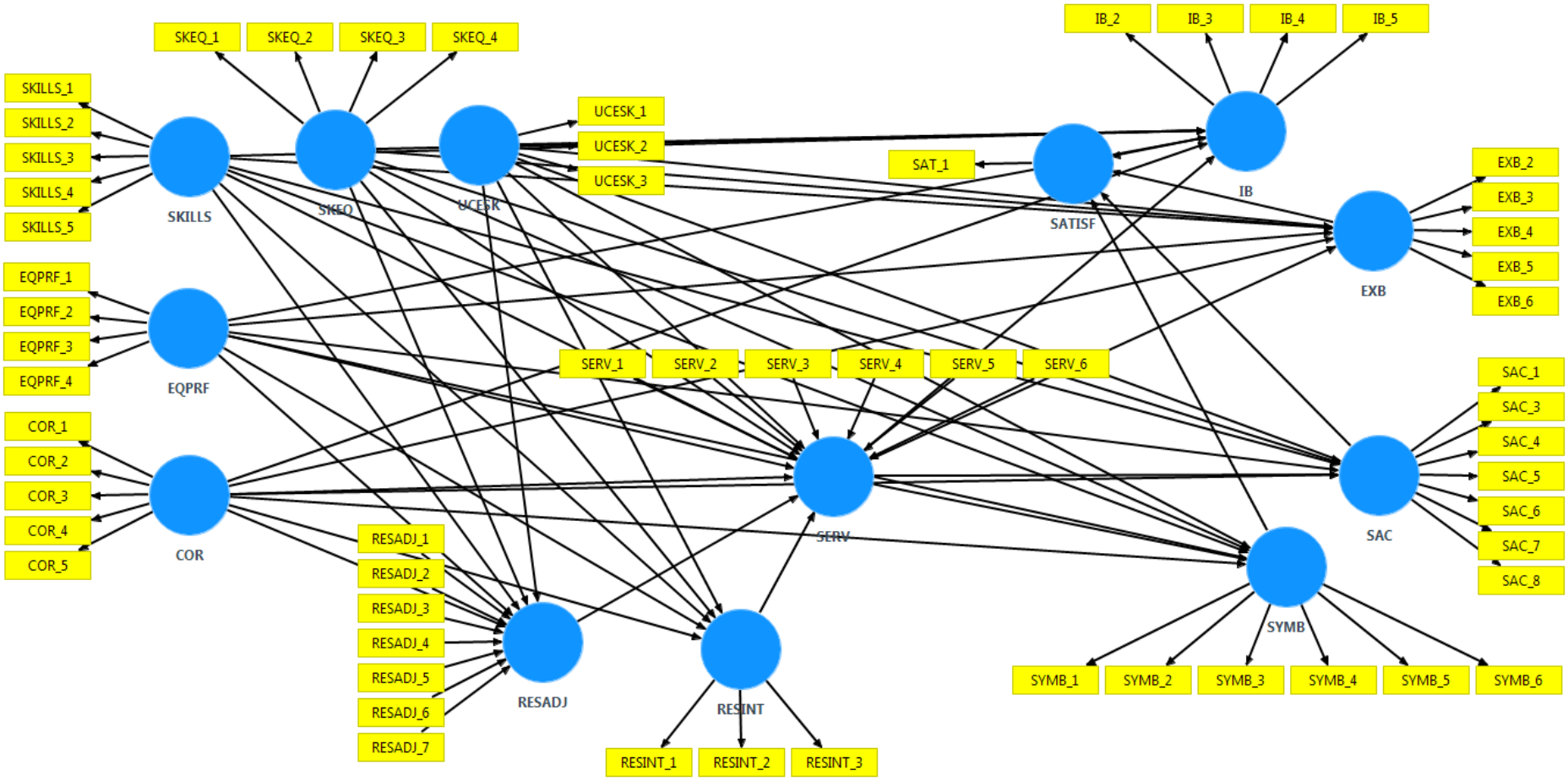
For this model the data obtained in the Study 4a was used. Based on the question Q34 (see Appendix 16), 449 cases in which camera users reported to be alone (the case of customer's value creation) were identified. The socio-demographic profile of the customer's value creation subsample is provided in Appendix 7. The sample size (n=449) was large and significantly bigger than the minimal number of observations required by PLS-SEM (n_{min}=70) following the '10 times rule' (RESADJ has 7 formative indicators thus 7x10=70).

Given that the initial path model contained two HOCs (exogenous formative RES and endogenous formative VALUE), the two-step HOC estimation procedure dictated the way the model estimation in the Smart-PLS was approached. The first-step value creation path model was built by: (a) removing the HOCs; and (b) inter-connecting the latent variables that were hypothesised to interact through the HOCs (see Figure 10). The model was then estimated to: (a) check for the statistical properties of measurement models (scales and indexes) placed in the nomological network of the first-step value creation model; and (b) to obtain scores on latent variables required for the construction of HOCs in the second-step value creation path model (see Figure 11). The second-step value creation path model then underwent the full model evaluation procedure as elaborated in the Section 6.3. The rest of Section 6.4 provides an assessment of the result of the first and second-step PLS-SEM customer's value creation path models.

6.4.1. Assessment of the first-step customer's value creation path model

This section: (a) tests for the reliability and validity of measurement models (indexes and scales) at the first-level path model; and (b) obtains latent scores of LOCs that were turned into formative items for their corresponding HOCs in the second-step model. Noticeable, the first-step structural model evaluation was not examined given that the relationships non-mediated by HOCs are not of interest (i.e. the focus is on higher level of abstraction not on the idiosyncrasies and particularities). Following the HOCs removal and the latent constructs interconnection (without mediation of the HOCs), the first-step model was designed (see Figure 10) and estimated. The findings on the first-step customer's value creation path model are provided in the rest of the section and the latent variable scores are provided in Appendix 11.

Figure 10: First-step customer's value creation path model



6.4.1.1. Assessment of reflective measurement models

Convergent validity and internal consistency

In the first-step customer's value creation path model, the scales were found to have good psychometric properties. Namely, all of the reflective indicators had loadings above .70 and were significant at the .01 significance level. Each reflective indicator scored higher than .50 on the indicator reliability test, which implied that the underlying latent variables explained more than half of their observed reflective indicators' variance, while the smaller portion of the variance remained unexplained. Furthermore, all scales scored well above .50 for AVE, while the majority scored above .70. According to the results obtained on loadings, indicator reliability and AVE, the scales and their reflective indicators have demonstrated convergent validity. Both composite reliability (CR) and Cronbach's α were significantly above the threshold value of .70 confirming excellent internal consistency of scales (see Table 43).

Discriminant validity

Each of the 54 individual reflective items had the highest loading on the scales they were originally assigned to. Furthermore, the results of Fornell-Larcker test demonstrated that all of the scales were distinctive, meaning that they indeed measure and represent different latent phenomena (the square root of AVE for each scale was higher than its correlations with other latent constructs in the model). Thus, it was concluded that all of the scales present in the model achieved discriminant validity. Detailed results of the discriminant validity test are provided in Appendix 9 (Cross-loadings) and Table 44 (Fornell-Larcker test).

Table 43: Convergent validity and internal consistency scale assessments for the first-step customer's value creation path model

Scale	Indicators	Loadings	Indicator Reliability	AVE	CR	Cronbach's α	Discriminant validity
COR	COR_1	.818	.669	.780	.947	.929	Yes
	COR_2	.891	.795				
	COR_3	.919	.845				
	COR_4	.886	.784				
	COR_5	.898	.807				
EQPRF	EQPRF_1	.759	.576	.742	.920	.883	Yes
	EQPRF_2	.881	.776				
	EQPRF_3	.907	.823				
	EQPRF_4	.890	.793				
EXB	EXB_2	.880	.775	.764	.942	.923	Yes
	EXB_3	.880	.775				
	EXB_4	.839	.704				
	EXB_5	.851	.724				
	EXB_6	.918	.843				
IB	IB_2	.895	.802	.774	.932	.903	Yes
	IB_3	.852	.726				
	IB_4	.874	.764				
	IB_5	.897	.805				
RESINT	RESINT_1	.838	.702	.728	.889	.813	Yes
	RESINT_2	.822	.675				
	RESINT_3	.898	.807				
SAC	SAC_1	.766	.586	.667	.933	.917	Yes
	SAC_3	.763	.583				
	SAC_4	.771	.595				
	SAC_5	.844	.713				
	SAC_6	.878	.771				
	SAC_7	.835	.697				
	SAC_8	.850	.722				
SAT	SAT_1	1.000	1.000	1.000	1.000	1.000	Yes
SKEQ	SKEQ_1	.912	.832	.742	.920	.882	Yes
	SKEQ_2	.888	.789				
	SKEQ_3	.761	.579				
	SKEQ_4	.876	.767				
SKILLS	SKILLS_1	.906	.820	.768	.943	.924	Yes
	SKILLS_2	.843	.711				
	SKILLS_3	.813	.662				
	SKILLS_4	.912	.832				
	SKILLS_5	.902	.814				
SYMB	SYMB_1	.803	.644	.712	.937	.919	Yes
	SYMB_2	.828	.686				
	SYMB_3	.883	.779				
	SYMB_4	.782	.611				
	SYMB_5	.868	.753				
	SYMB_6	.893	.798				
UCESK	UCESK_1	.907	.823	.855	.947	.915	Yes
	UCESK_2	.927	.860				
	UCESK_3	.940	.884				
Note:	All outer loading coefficients are significant at .01 level						

Table 44: Discriminant validity test using Fornell-Larcker criterion for the first-step customer's value creation path model

Scale	COR	EQPRF	EXB	IB	RESADJ	RESINT	SAC	SAT	SERV	SKEQ	SKILLS	SYMB	UCESK
COR	**.883**												
EQPRF	.436	**.861**											
EXB	.455	.260	**.874**										
IB	.589	.404	.591	**.880**									
RESADJ	.138	.348	.246	.164	**Form.**								
RESINT	.426	.402	.384	.446	.209	**.853**							
SAC	-.051	.069	-.024	-.034	.266	-.047	**.817**						
SAT	.529	.316	.539	.742	.116	.295	-.062	**1.000**					
SERV	.523	.346	.529	.650	.112	.535	-.086	.561	**Form.**				
SKEQ	.461	.532	.350	.492	.306	.379	-.005	.403	.426	**.861**			
SKILLS	.320	.467	.322	.433	.312	.300	.082	.360	.371	.603	**.876**		
SYMB	.491	.321	.599	.576	.257	.373	.202	.515	.469	.332	.360	**.844**	
UCESK	.495	.561	.317	.489	.309	.426	.047	.411	.436	.663	.600	.361	**.925**

Notes: Form.=formative construct
1-item= one item reflective construct
Diagonal value is square root of AVE for the observed construct

6.4.1.2. Assessment of formative measurement models

Convergent validity

The two indexes present in the first-step customer's value creation path model (RESADJ, SERV) have demonstrated convergent validity (see Appendix 10).

Collinearity among indicators

Given that all formative indicators had values for TOL above .20 and values for VIF below the critical value of 5, no severe collinearity problems were identified at this stage (see Table 45). However, it was worrying that some indicators had VIFs above 3.3, which potentially might indicate increased collinearity that can bias the outer weight estimation when an index is placed in a nomological network (Peng and Lai, 2012). Furthermore, the RESADJ items have relatively high coefficient of variation (CV) (compared to SERV) which might indicate the absence or presence of a relatively uniform view on certain phenomena (Wagner et al., 1984). In this context this can point to underlying heterogeneity (Sørensen, 1999).

Table 45: Collinearity diagnostics for formative indicators with descriptives in the first-step customer's value creation path model

Index	Indicators	μ	σ	CV	TOL	VIF
RESADJ	RESADJ_1	2.915	1.711	.587	.331	3.020
	RESADJ_2	2.290	1.649	.720	.245	4.075
	RESADJ_3	2.187	1.577	.721	.247	4.048
	RESADJ_4	2.904	1.802	.621	.300	3.338
	RESADJ_5	3.492	1.890	.541	.366	2.735
	RESADJ_6	2.829	1.872	.662	.356	2.812
	RESADJ_7	3.125	1.829	.585	.255	3.920
SERV	SERV_1	5.408	1.265	.234	.375	2.666
	SERV_2	5.572	1.132	.203	.213	4.699
	SERV_3	5.548	1.147	.207	.214	4.681
	SERV_4	5.488	1.186	.216	.308	3.243
	SERV_5	5.508	1.132	.206	.271	3.693
	SERV_6	5.512	1.182	.214	.329	3.040

Significance and relevance of outer weights

The final stage of the formative measurement model evaluation is testing for the significance and relevance of outer weights. This set of test shows which formative items have relative and/or absolute importance in explaining the latent construct they define (see Decision column in Table 46).

Table 46: Significance and relevance of outer weights in the first-step customer's value creation path model

Index	Indicators	Outer weight	Outer loading	*t* value	*p* value	Sig. level α	Confidence interval[a]	Decision
RESADJ	RESADJ_1	.742	.800	4.478	.000	.01	[.469, 1.015]	Keep
	RESADJ_2	.209	.446	1.222	.222	NS	[-.073, 0.491]	Remove due to insignificance
	RESADJ_3	-.877	.264	3.265	.001	.01	[-1.319, -.434]	Remove due to high collienarity
	RESADJ_4	.209	.698	1.123	.261	NS	[-.098, .517]	Remove due to insignificance
	RESADJ_5	.186	.687	1.296	.195	NS	[-.051, .422]	Remove due to insignificance
	RESADJ_6	.001	.557	.010	.992	NS	[-.197, .199]	Remove due to insignificance
	RESADJ_7	.354	.763	1.792	.073	.10	[.028, .681]	Keep
SERV	SERV_1	.348	.898	3.482	.001	.01	[.183, .512]	Keep
	SERV_2	.115	.818	1.226	.220	NS	[-.040, .269]	Keep due to high outer loading
	SERV_3	.056	.803	.786	.432	NS	[-.062, .175]	Keep due to high outer loading
	SERV_4	.234	.891	2.817	.005	.01	[.097, .372]	Keep
	SERV_5	.215	.889	2.081	.038	.05	[.044, .385]	Keep
	SERV_6	.173	.861	2.040	.041	.05	[.033, .313]	Keep

Notes: NS=not significant
a=Bootstrap confidence intervals with α=.10

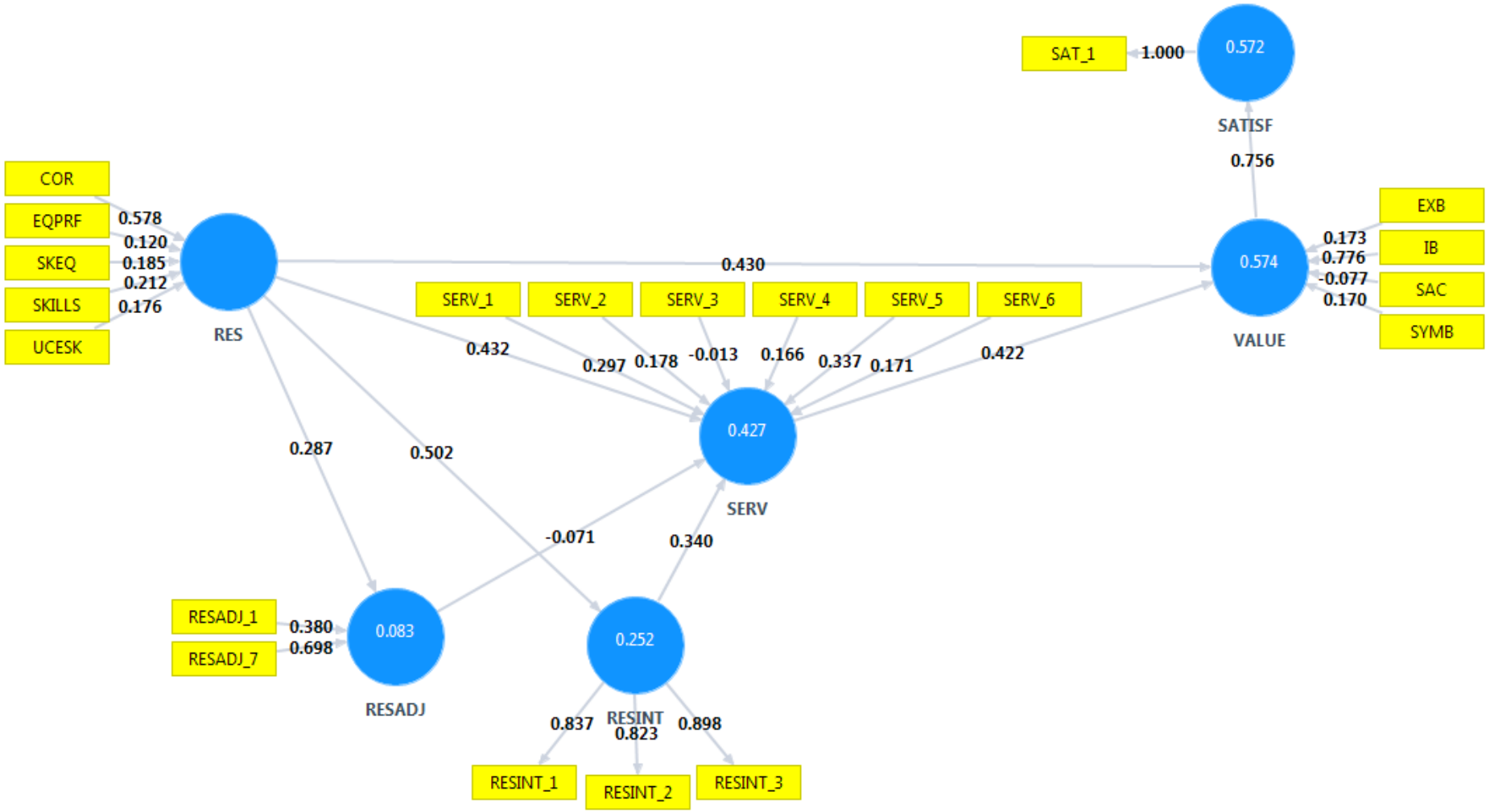
The RESADJ has lost 5 items due to insignificance and/or high collinearity. The removed items have a high degree of variability (see CV column in Table 45). Following result estimation and assessments with the refined scales and indexes, the results of the latent scores were saved in the dataset as new variables. The relevant latent variables were used as new variables in the second-step for building the HOCs, while all of the latent variables were used for the model collinearity tests.

6.4.2. Assessment of the second-step customer's value creation path model

In the first-step customer's value creation path model, indexes and scales were assessed and refined. Furthermore, latent scores obtained in the first-step model for COR, EQPRF, SKEQ, SKILLS, UCESK were assigned to RES, while latent scores for EXB, IB, SAC and SYMB were assigned to VALUE as formative indicators (see Figure 11 for the model and Appendix 11 for the latent scores). The outcome of this procedure gave a parsimonious model of customer's value creation, while all latent constructs present in the model were now *de facto* first order constructs. Having said this, all the conditions were met to exercise a full path model evaluation.

The rest of the section provides a full second-step customer's value creation path model evaluation.

Figure 11: Second-step customer's value creation path model with estimated parameters



6.4.2.1. Assessment of reflective measurement models

Convergent validity and internal consistency

In the second-step customer's value creation path model, the scales were found to have good psychometric properties. All of the reflective indicators had loadings above the threshold value of .70 (all above .80) and were significant at the .01 significance level. Each reflective indicator scored higher than .50 on the indicator reliability test, which implies that the underlying latent variable explains more than half of its observed reflective indicators' variance. Furthermore, all scales scored well above .50 (all scales scored above .70 on CR and Cronbach's α). According to the results obtained on loadings, indicator reliability and AVE (see Table 47), it can be concluded that the scales and their reflective indicators have demonstrated convergent validity. Both composite reliability (CR) and Cronbach's α were significantly above threshold value of .70 confirming excellent internal consistency of scales.

Table 47: Convergent validity and internal consistency scale assessments in the second-step customer's value creation path model

Scale	Inicators	Loadings	Indicator Reliability	AVE	CR	Cronbach's α	Discriminant validity
RESINT	RESINT_1	.837	.700	.728	.889	.813	Yes
	RESINT_2	.823	.678				
	RESINT_3	.898	.806				
SAT	SAT_1	1.000	1.000	1.000	1.000	1.000	Yes

Discriminant validity

Each of the 4 individual reflective items had the highest loading on the scales that were defined to belong to. Furthermore, the results of Fornell-Larcker test demonstrated that all of the scales were distinctive, meaning that they indeed measured and represented different latent phenomena (the square root of AVE for each scale was higher than its correlations with other latent constructs in the model). Thus, it can be concluded that all of the scales present in the model achieved discriminant validity. Details are provided in Table 2 in Appendix 9 (Cross-loadings) and Table 48 (Fornell-Larcker test).

Table 48: Discriminant validity test using Fornell-Larcker criterion for the second-step customer's value creation path model

Scale	RES	RESADJ	RESINT	SAT	SERV	VALUE
RES	**Form.**					
RESADJ	.287	**Form.**				
RESINT	.502	.193	**.853**			
SAT	.565	.128	.295	**1-item**		
SERV	.582	.119	.543	.553	**From.**	
VALUE	.676	.209	.476	.756	.672	**Form.**

Notes: Form. = formative construct
1-item = one item reflective construct
Diagonal value is square root of AVE for the observed construct

6.4.2.2. Assessment of formative measurement models

Convergent validity

The four indexes (RES, VALUE, RESADJ and SERV) demonstrated convergent validity (see Appendix 10).

Collinearity among indicators

Given that all formative indicators had values for TOL above .20 and values for VIF below critical value of 5, no severe collinearity problems were identified at this stage (see Table 49).

Table 49: Collinearity diagnostic for formative indicators in the second-step customer's value creation path model

Index	Indicators	TOL	VIF
RES	COR	.701	1.427
	EQPRF	.615	1.625
	SKEQ	.471	2.123
	SKILLS	.558	1.791
	UCESK	.437	2.287
RESADJ	RESADJ_1	.518	1.929
	RESADJ_7	.518	1.929
SERV	SERV_1	.375	2.666
	SERV_2	.213	4.699
	SERV_3	.214	4.681
	SERV_4	.308	3.243
	SERV_5	.271	3.693
	SERV_6	.329	3.040
VALUE	EXB	.573	1.746
	IB	.577	1.733
	SAC	.918	1.089
	SYMB	.577	1.732

Significance and relevance of outer weights

The final stage of the formative measurement model evaluation was to test for the significance and relevance of the outer weights. This set of test show which formative items have relative and/or absolute importance in explaining the latent construct they define. Furthermore, given the preceding evaluations of RES and VALUE the results of these analyses allow the confirmation or rejection of hypotheses H_7 and H_8 (see Table 42) about the structure of the HOCs.

From the list of the examined formative indicators only one indicator SERV_3 had non-significant outer weight. However, its outer loading was significantly above the threshold of .50 and it was therefore kept. Another very important finding was that SAC (sacrifice as a dimension of VALUE) had a small, negative (as expected) and significant outer weight. In the context of the customer's value creation path model this confirms the initial hypotheses/definitions about sacrifice as a building block of value. The negative sign on this indicator was expected. Interestingly, the magnitude of this weight is relatively small which is

understandable given that taking a photograph is generally an activity that requires a low sacrifice. Given that all other formative indicators of RES had significant weight the H_8 was fully confirmed. The same is applicable for the H_7. Detailed findings on significance and relevance of outer weights are provided in the Table 50.

Table 50: Significance and relevance of outer weights in the second-step customer's value creation path model

Index	Indicators	Outer weight	Outer loading	*t* value	*p* value	Sig. level α	Confidence interval[a]	Decision
RES (H_7)	COR	.578	.869	9.903	.000	.01	[.482, .674]	Keep
	EQPRF	.120	.664	1.822	.069	.10	[.011, .299]	Keep
	SKEQ	.185	.754	2.595	.009	.01	[.067, .303]	Keep
	SKILLS	.212	.669	3.247	.001	.01	[.104, .319]	Keep
	UCESK	.176	.777	2.365	.018	.05	[.053, .299]	Keep
RESADJ	RESADJ_1	.380	.865	1.943	.052	.10	[.057, .703]	Keep
	RESADJ_7	.698	.962	3.641	.000	.01	[.382, 1.014]	Keep
SERV	SERV_1	.297	.881	3.221	.001	.01	[.145, .449]	Keep
	SERV_2	.178	.822	1.754	.080	.10	[.011, .345]	Kepp
	SERV_3	-.013	.793	.204	.839	NS	[-.121, .095]	Keep due to high outer loading
	SERV_4	.166	.875	2.000	.046	.05	[.029, .303]	Keep
	SERV_5	.337	.916	3.061	.002	.01	[.156, .519]	Keep
	SERV_6	.171	.867	1.893	.058	.10	[.022, .320]	Keep
VALUE (H_8)	EXB	.173	.725	3.631	.000	.01	[.094, .251]	Keep
	IB	.776	.973	20.009	.000	.01	[.712, .840]	Keep
	SAC	-.077	-.075	1.968	.049	.05	[-.142, -.012]	Keep
	SYMB	.170	.668	4.054	.000	.01	[.101, .239]	Keep

Notes: NS=not significant
a=Bootstrap confidence intervals with α=.10

The next section provides detailed structural analysis of the second-step customer's value creation path model.

6.4.2.3. Assessment of the customer's value creation structural model

Assessing structural model for collinearity issues

For this step, the latent score estimates obtained in the second-step customer's value creation path model were used. When assessing the structural model for collinearity issues it was necessary to observe groups of exogenous latent variables that explain/predict a particular endogenous latent variable. The results provided in Table 51 shows that there were no collinearity issues in the second-step value creation path model, given that for all predictors TOL was well above .20 and VIF was well below 5.

Table 51: Collinearity diagnostic for the exogenous latent variables in the second-step customer's value creation path model

Endogenous	Exogenous	TOL	VIF
SERV	RES	.711	1.407
	RESADJ	.915	1.093
	RESINT	.746	1.340
VALUE	RES	.661	1.512
	SERV	.661	1.512

Assessing the significance and relevance of the structural model relationships

The bootstrapping procedure showed that all of the inner path weights were significant (see Table 52). However, the RESADJ→SERV path coefficient had a negative sign and small magnitude which was unexpected. Furthermore this outer weight was significant at α=.10. The reasons why this might have happened are following:

(1) There are differences in the perception of the level of effort placed in resource adjustment where the camera user performs manual adjustments versus automatic or semi-automatic adjustment (see Appendix 15). This point to underlying heterogeneity which would require estimation of three additional path models of customer's value creation across the three identified situations of heterogeneity due to different adjustment types (Sørensen, 1999). Hand in hand with this goes the high coefficient of variability of RESADJ (see Appendix 11, RESADJ has the

highest CV). This suggests that the way RESADJ is currently operationalized does not apply to all situations and further refinements are needed;

(2) It appears that measuring quantity of adjustments is not useful approach to illustrate importance of RESADJ. Instead measuring quality of adjustments might have been more appropriate; and

(3) Finally, the word 'adjustments' might have unintentionally over-emphasised the role of equipment from the portfolio of resources employed.

Table 52: Significance and relevance of the structural model relationships in the second-step customer's value creation path model

Path	Path weight	*t* value	*p* value	Sig. level α	90% confidence interval
RES→RESADJ	.287	6.204	.000	.01	[.211, .364]
RES→RESINT	.502	12.214	.000	.01	[.434, .569]
RES→SERV (H_1)	.432	7.823	.000	.01	[.341, .523]
RES→VALUE	.430	8.981	.000	.01	[.351, .509]
RESADJ→SERV (H_2)	-.071	1.955	.051	.10	[-.131, -.011]
RESINT→SERV	.340	5.672	.000	.01	[.241, .439]
SERV→VALUE (H_3)	.422	8.527	.000	.01	[.340, .504]
VALUE→SAT (H_5)	.756	27.795	.000	.01	[.711, .801]

Assessing the level of R^2

In total there were five endogenous latent constructs. Of particular interest for prediction and explanation by the model were SERV and VALUE. In the case of SERV, the model explained 42.7% of its variance which is according to the marketing studies using PLS-SEM considered to be a moderate amount of variance explained (Hair et al., 2014). Furthermore the model explains 57.4%, or more than half of the total variance of VALUE. Both levels of explained variance in SERV and VALUE are very satisfactory given that for the sake of parsimony only few phases of value creation process from the qualitative model were included into the quantitative model. However, if this study was considered as a customer behaviour study where models that explains 20% or more of some focal phenomenon is considered to have an excellent predictive and explanatory capability, the R^2 scores for SERV and VALUE would be deemed more than satisfactory. Also, if compared to Ranjan and Read (2014) study, the model has significantly better explanatory power of value-in-use (the R^2 for

value-in-use in their study was .38). This also implies that the model of value creation is well framed and has a very good explanatory capability for the focal constructs of service and value. Table 53 provides full details of the R^2 of the endogenous latent variables in the second-step customer's value creation model.

Table 53: R^2 of the endogenous latent variables in the second-step customer's value creation path model

Endogenous construct	R^2	R^2_{adj}	Determination
RESADJ	.083	.080	weak
RESINT	.252	.250	moderate
SAT	.572	.571	substantial
SERV	.427	.423	moderate
VALUE	.574	.572	substantial

Assessing the effect sizes (f^2)

Effect sizes (f^2) show the size of the predictive impact of an exogenous latent variable on an endogenous latent variable. When speaking of SERV, RES is the most important predictor, followed by RESINT and RESADJ. Both RES and RESINT have medium effect sizes on SERV, while RESADJ has a small predictive effect size. In the case of VALUE, SERV has the most important predictive impact, followed by RES (see Table 54).

Table 54: f^2 of the endogenous latent variables in the second-step customer's value creation path model

Path	R^2 predictor included	R^2 predictor excluded	f^2	Size
RES→SERV	.427	.308	.208	medium
RES→VALUE	.574	.450	.291	medium
RESADJ→SERV	.427	.424	.005	small
RESINT→SERV	.427	.344	.145	medium
SERV→VALUE	.574	.454	.282	medium

6.4.2.4. Mediation effect

In total three mediations were hypothesised to be present in the customer's value creation path model:

1. RESADJ mediating RES→SERV;
2. RESINT mediating RES→SERV;
3. SERV mediating RES→ VALUE.

It was found that RESADJ is not a mediator of the RES→SERV relationship given that the compound path was non-significant. Some of the reasons for this could be found in the reasons of why the RESADJ→SERV path of had a negative sign and was small in magnitude. This would imply that resource adjustments, as a sub-process of service creation, most likely do not hold an equal importance across all types of camera users and different camera usage events (in our qualitative studies there were many cases in which the advanced users were emphasising the importance of resource adjustments). Furthermore, resource adjustments can be perceived differently in cases when adjustments are performed by a camera user and in cases when the equipment is auto-adjusted. The findings in Appendix 11 showed that RESADJ had relatively high coefficient of variability. Together with the results provided in Appendix 15 (ANOVA) there are indications that RESADJ was rendered insignificant mediator due to underlying heterogeneity. Addressing this issue would require some of the actions suggested in Section 6.4.2.3. Therefore, further examinations of this issue are needed. On the other hand, RESINT and SERV were confirmed as mediators. RESINT appeared to be a partial mediator of the RES→SERV relationship thus, definitely confirming that this process in nested in the process of service creation. The RESINT as mediator accounts for 28.87% of all explained variance in SERV. Furthermore, SERV was found to be a mediator of the RES→VALUE relationship which suggests that service creation is a process nested in the value creation process. Or to be more precise – service creation comes before value creation. SERV as a mediator accounts for 36.18% of all explained variance in VALUE. Therefore, the structure RES→SERV→VALUE appeared to be a backbone of the value creation model (see details in Table 55).

Table 55: Assessment of the mediation effects in the second-step customer's value creation path model

Step 1: Assessment of the significance of direct effects				
Direct Path	Direct path weight	*t* value	*p* value	Sig. level α
RES→SERV	.584	17.352	.000	.01
RES→SERV	.584	17.352	.000	.01
RES→VALUE	.683	23.884	.000	.01

Table 55 (continued): Assessment of the mediation effects in the second-step customer's value creation path model

Step 2: Assessment of the significance of indirect effects							
Indirect (compound) path		Compound path weight	*t* value	*p* value	Sig. level α	VAF	Conclusion
(RES→RESADJ)x(RESADJ→SERV)	H_2	-.016	-1.432	.152	NS	-2.74%	No mediation
(RES→RESINT)x(RESINT→SERV)	H_3	.168	4.607	.000	.01	28.87%	Partial mediation
(RES→SERV)x(SERV→VALUE)	H_6	.246	7.494	.000	.01	36.18%	Partial mediation

6.4.3. Findings for the model of customer's value creation (Study 4c)

Section 6.4 examined the hypothesised path model of customer's value creation. For this purpose, situations in which camera users did not have direct interactions with any other actors were observed. The model was found to explain a substantial variance in the phenomena of SERV (R^2=.427) and VALUE (R^2=.574). 7 out of 8 hypotheses were confirmed (see Table 56). It was found that SAC is a theoretically important dimension of VALUE, thus, confirming the initial hypothesis that definition of value should, alongside benefits, also include a sacrifice component. However, SAC in this particular consumption context appeared to have a very low magnitude (see Appendix 11). The hypothesised anatomy of customer's value creation model was to a great extent confirmed. Most importantly the model's 'backbone' (RES→SERV→VALUE) was confirmed to be theoretically sound, thus, confirming that service creation is a process nested in the process of value creation (see Figure 3). RESADJ was not confirmed as sub-process of service creation, while RESINT was confirmed to be a mediator and thus definitely a nested sub-process in the process of

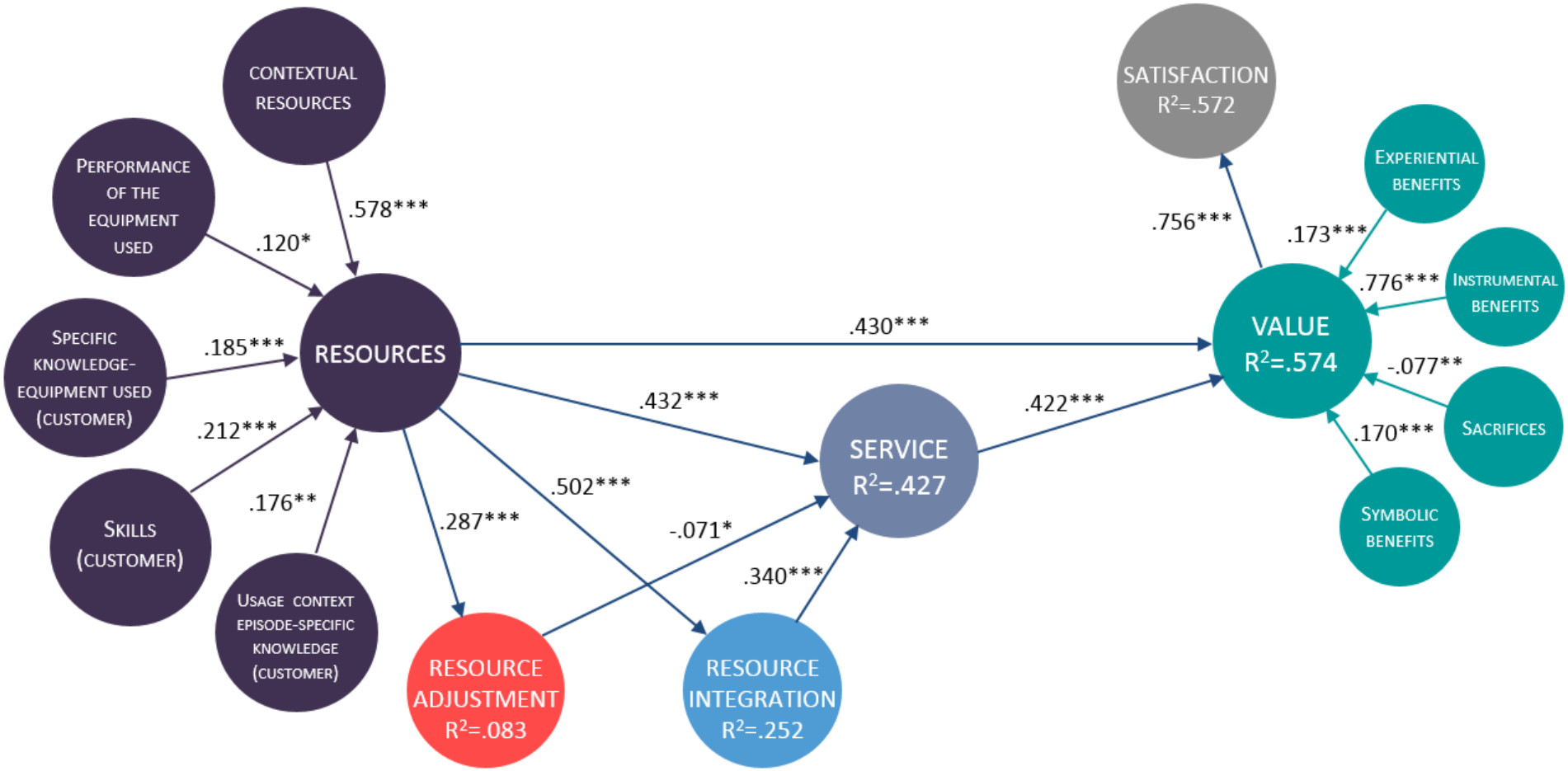
customer's service creation. RESADJ captured the level of activity performed for the preparation of all of the resources for the resource integration. Its magnitude was 3.048 meaning that this construct appears as a phenomenon that is occurring in value creation. However, due to high variability in RESADJ (see Appendix 11) this lead to ANOVA test (see Appendix 15) which has demonstrated the presence of heterogeneity across different adjustment modes (manual, semi-manual and automatic). Further testing of RESADJ would require estimation of three additional path models of customer's value creation across the three identified situations of heterogeneity (different adjustment types). However, that exercise is part of further research agenda. However, what can be concluded at this stage is that the way RESADJ is currently operationalized does not apply to all situations and measuring the quality of the resource adjustments could have potentially worked better in this model.

One of the most interesting side findings was that contextual resources (COR) play the most important role in the portfolio of applied resources. This is surprising given that COR are operand resources or resources that are acted upon. This side-finding represents a challenge for SDL/SL that attributes operant resources with a primary role in value creation. Finally, based on the evidence, service and value should be distinguished in SDL/SL theory because this empirical exercise demonstrates and confirms that these two concepts are distinct. Service represents applied resources, while value represents the mix of benefits and sacrifices that is function of the customer's created service. The summary of the outcomes of the hypotheses tested is provided Table 56, while the value creation model with path weights, significance levels and R^2 coefficients is provided in Figure 12.

Table 56: The summary of hypotheses with decisions

Hypothesis		Decision
H_1	The better the resource portfolio employed in use, the better the service created. (res→serv)	Confirmed
H_2	The more resource adjustments are performed the better the service created. Resource adjustment is a transformative process that resources undergo during the process of service creation. (res→resadj→serv)	Not confirmed
H_3	Resource integration is a transformative process that resources undergo during the process of service creation. (res→resint→serv)	Confirmed
H_4	The better the employment of resources into service, the higher the episodic value created. (serv→value)	Confirmed
H_5	The higher the value created, the higher the customer's satisfaction of the customer with the service created. (value→sat)	Confirmed
H_6	Service creation is a process nested in the process of value creation. Service mediates the transformation of resources into value. (res→serv→value)	Confirmed
H_7	The portfolio of resources (res) in the context of value creation consists of customer knowledge (ucesk, skeq), customer skills (skills), contextual resources (cor) and the equipment used (eqprf).	Confirmed
H_8	Value in the context of value creation is a mix of experiential benefits (exb), instrumental benefits (ib), symbolic benefits (symb) and sacrifices (sac).	Confirmed

Figure 12: Customer's value creation model with path estimates and R^2 coefficients



Note: ***α=.01, ** α=.05, * α=.10, R^2 – explained variance

6.5. Testing the model of value co-creation (Study 4d)

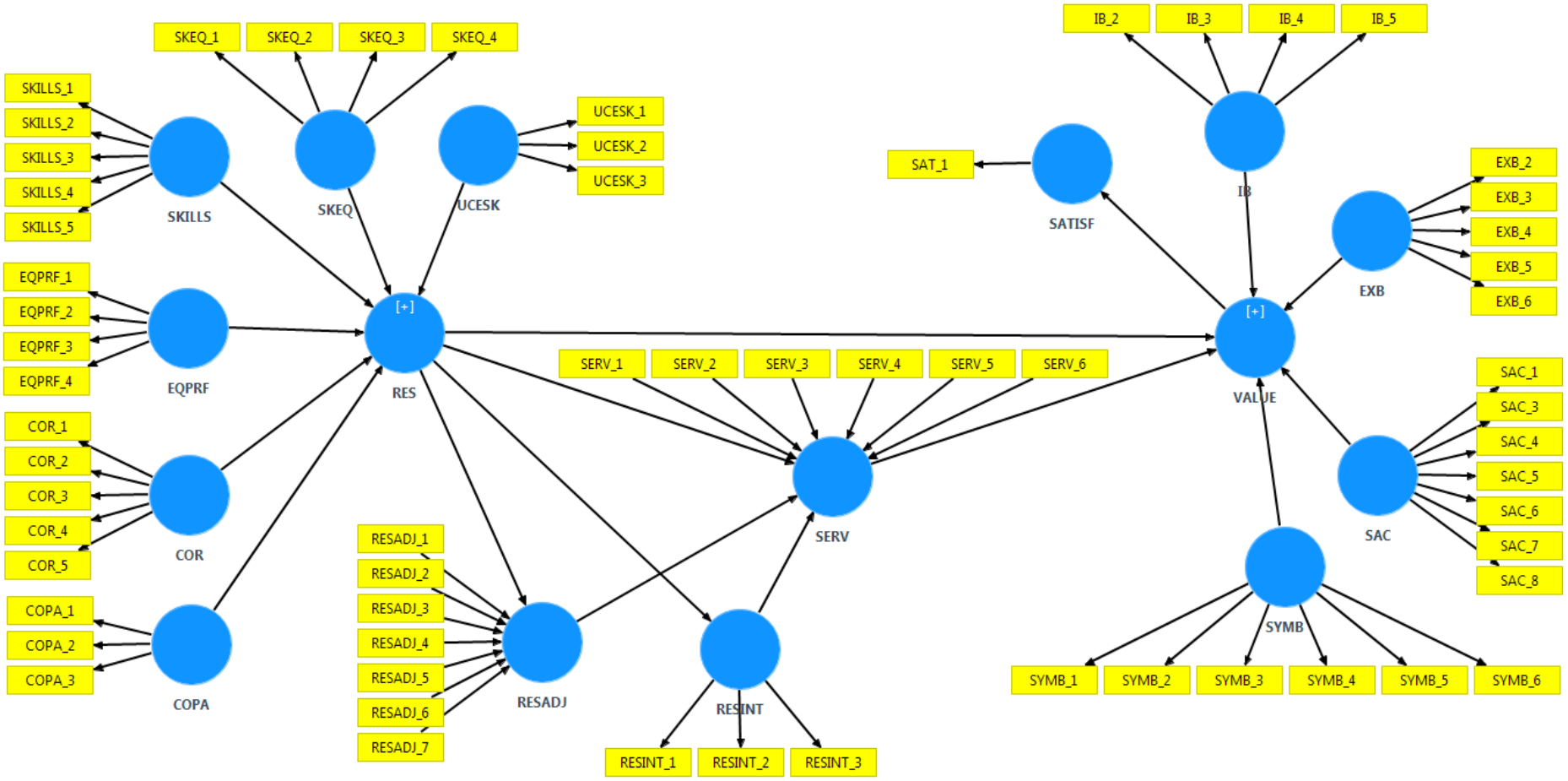
Based on the quantitative conceptual model of value co-creation shown in Figure 4, and the focal research questions (RQ1, RQ2 and RQ3), 8 hypotheses were proposed (see Table 57).

Table 57: Structural theory for the value co-creation path model – hypotheses

H_1	THE BETTER THE RESOURCE PORTFOLIO EMPLOYED IN USE, THE BETTER THE CO-CREATED SERVICE. (RES→SERV)
H_2	THE MORE RESOURCE ADJUSTMENTS ARE PERFORMED THE BETTER THE SERVICE CREATED. RESOURCE ADJUSTMENT IS A TRANSFORMATIVE PROCESS THAT RESOURCES UNDERGO DURING THE PROCESS OF SERVICE CREATION. (RES→RESADJ→SERV)
H_3	RESOURCE INTEGRATION IS A TRANSFORMATIVE PROCESS THAT RESOURCES UNDERGO DURING THE PROCESS OF SERVICE CO-CREATION. (RES→RESINT→SERV)
H_4	THE BETTER THE EMPLOYMENT OF RESOURCES INTO CREATED SERVICE, THE HIGHER THE CO-CREATED EPISODIC VALUE. (SERV→VALUE)
H_5	THE HIGHER THE CO-CREATED VALUE, THE HIGHER THE CUSTOMER'S SATISFACTION OF WITH THE CO-CREATED SERVICE. (VALUE→SAT)
H_6	SERVICE CO-CREATION IS A PROCESS NESTED IN THE PROCESS OF VALUE CO-CREATION. SERVICE MEDIATES THE TRANSFORMATION OF RESOURCES INTO VALUE. (RES→SERV→VALUE)
H_7	THE PORTFOLIO OF RESOURCES (RES) IN THE CONTEXT OF VALUE CO-CREATION CONSISTS OF CUSTOMER KNOWLEDGE (UCESK, SKEQ), CUSTOMER SKILLS (SKILLS), CONTEXTUAL RESOURCES (COR) AND THE EQUIPMENT USED (EQPRF).
H_8	VALUE IN THE CONTEXT OF VALUE CO-CREATION IS A MIX OF EXPERIENTIAL BENEFITS (EXB), INSTRUMENTAL BENEFITS (IB), SYMBOLIC BENEFITS (SYMB) AND SACRIFICES (SAC).

Given that Section 6.5 is very similar to Section 6.4, only relevant results were reported and discussed. Based on the structural theory (see Table 57) and the measurement theory developed in Chapter 5, the initial PLS-SEM path model of value co-creation was created in the Smart-PLS 3.1.6 (Ringle et al., 2014) – see Figure 13.

Figure 13: Initial value co-creation path model



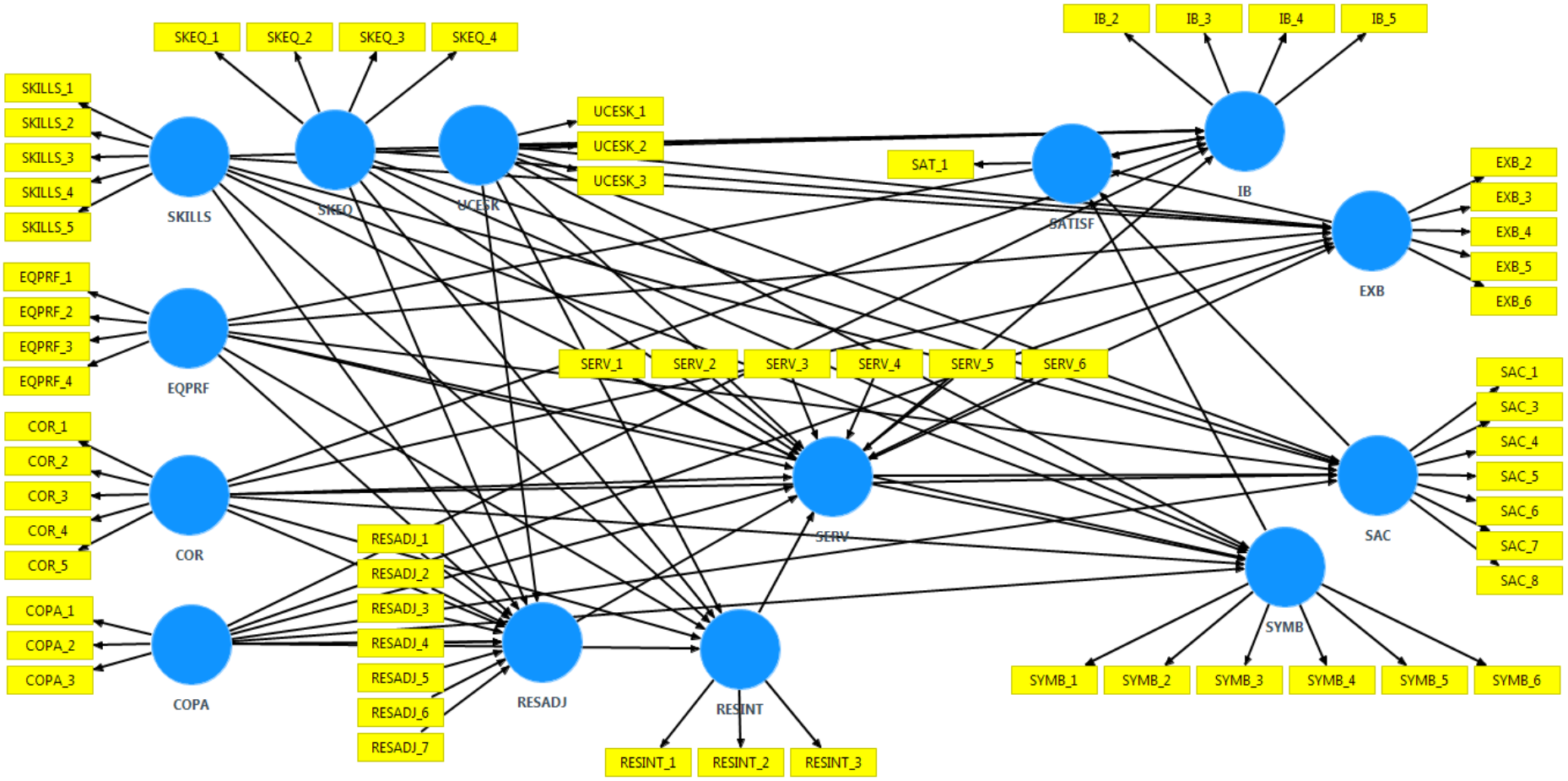
For this study there were 151 cases in which camera users reported to have interacted with other actors in the course of taking photographs (the case of value co-creation). The socio-demographic profile of this subsample is given in Appendix 8. The sample size (n=151) was twice bigger than the minimal number of observations required by PLS-SEM (n_{min}=70) for the estimation of the path model of value co-creation following the 10 times rule (RESADJ has 7 formative indicators, thus 7x10=70).

Given that initial path model contained two HOCs (RES and VALUE), the two-step HOC estimation procedure dictated the Smart-PLS estimation approach. The first-step value co-creation path model is given in Figure 14 and the second-step model in Figure 15.

6.5.1. Assessment of the first-step value co-creation path model

This section: (a) tests for the reliability and validity of measurement models at the first-level value co-creation path model; and (b) obtains latent scores of LOCs that were turned into formative items for their corresponding HOCs in the second-step model. Following the HOCs removal and the latent constructs interconnection, the first-step model was designed (see Figure 14). Latent scores for the model shown in Figure 14 are provided in Appendix 14.

Figure 14: First-step value co-creation path model



6.5.1.1. Assessment of reflective measurement models

Convergent validity and internal consistency

In the first-step value co-creation path model, the scales were found to have good psychometric properties. Namely, majority of the reflective indicators had loadings above .70 and were significant at the .01 significance level. However, the two indicators COPA_1 and SAC_1 had loadings slightly below .70. They were not removed from the model solution given that their removal did not raise the CR or AVE above threshold values. Furthermore, all scales scored well above .50 for AVE while the majority scored above .70. According to the results obtained on loadings, indicator reliability and AVE, it can be concluded that the scales and their reflective indicators have demonstrated convergent validity. Both composite reliability (CR) and Cronbach's α were significantly above the threshold value of .70 confirming very good or excellent internal consistency of scales (see Table 58).

Discriminant validity

Each of the 50 individual reflective items had the highest loading on the scales they were originally assigned to. Furthermore, the results of the Fornell-Larcker test demonstrated that all of the scales were distinctive, meaning that they indeed measure and represent different latent phenomena. Thus, it was concluded that all of the scales present in the model achieved discriminant validity. See Appendix 12 (Cross-loadings) and Table 59 (Fornell-Larcker test).

Table 58: Convergent validity and internal consistency scale assessments for the first-step value co-creation path model

Construct	Inicators	Loadings	Indicator Reliability	AVE	CR	Cronbach's α	Discriminant validity
COPA	COPA_1	.637	.405	.658	.849	.772	Yes
	COPA_2	.897	.804				
	COPA_3	.874	.763				
COR	COR_1	.795	.632	.744	.936	.914	Yes
	COR_2	.845	.715				
	COR_3	.874	.765				
	COR_4	.898	.806				
	COR_5	.897	.805				
EQPRF	EQPRF_1	.803	.645	.766	.929	.898	Yes
	EQPRF_2	.913	.834				
	EQPRF_3	.912	.831				
	EQPRF_4	.868	.754				
EXB	EXB_2	.829	.687	.729	.931	.907	Yes
	EXB_3	.879	.773				
	EXB_4	.825	.681				
	EXB_5	.829	.687				
	EXB_6	.905	.819				
IB	IB_2	.755	.571	.707	.906	.860	Yes
	IB_3	.875	.765				
	IB_4	.827	.684				
	IB_5	.899	.809				
RESINT	RESINT_1	.755	.571	.709	.879	.794	Yes
	RESINT_2	.838	.702				
	RESINT_3	.924	.853				
SAC	SAC_1	.700	.490	.653	.929	.911	Yes
	SAC_3	.780	.609				
	SAC_4	.751	.563				
	SAC_5	.839	.704				
	SAC_6	.871	.759				
	SAC_7	.850	.723				
	SAC_8	.852	.726				
SAT	SAT_1	1.000	1.000	1.000	1.000	1.000	Yes
SKEQ	SKEQ_1	.883	.779	.722	.912	.871	Yes
	SKEQ_2	.873	.762				
	SKEQ_3	.765	.586				
	SKEQ_4	.873	.762				
SKILLS	SKILLS_1	.919	.845	.768	.943	.924	Yes
	SKILLS_2	.859	.738				
	SKILLS_3	.803	.645				
	SKILLS_4	.878	.771				
	SKILLS_5	.917	.841				
SYMB	SYMB_1	.794	.631	.711	.936	.918	Yes
	SYMB_2	.846	.716				
	SYMB_3	.886	.785				
	SYMB_4	.791	.626				
	SYMB_5	.863	.745				
	SYMB_6	.874	.764				
UCESK	UCESK_1	.927	.860	.875	.955	.929	Yes
	UCESK_2	.938	.880				
	UCESK_3	.941	.886				

Note: All outer loading coefficients are significant at .01 level

Table 59: Discriminant validity test using Fornell-Larcker criterion for the first-step value co-creation path model

Construct	COPA	COR	EQPRF	EXB	IB	RESADJ	RESINT	SAC	SAT	SERV	SKEQ	SKILLS	SYMB	UCESK
COPA	**.811**													
COR	.211	**.863**												
EQPRF	.217	.453	**.875**											
EXB	.383	.422	.204	**.854**										
IB	.350	.565	.357	.527	**.841**									
RESADJ	-.044	.210	.254	.081	.293	**Form.**								
RESINT	.307	.458	.375	.466	.452	.294	**.842**							
SAC	.014	-.144	-.056	-.182	-.098	-.069	-.154	**.808**						
SAT	.287	.471	.430	.435	.757	.161	.339	-.073	**1.000**					
SERV	.340	.559	.316	.462	.645	.317	.660	-.206	.543	**Form.**				
SKEQ	.135	.346	.439	.134	.312	.046	.283	.060	.350	.279	**.850**			
SKILLS	.258	.317	.335	.223	.399	.224	.420	.066	.290	.318	.589	**.876**		
SYMB	.317	.456	.199	.518	.577	.171	.424	.097	.479	.513	.184	.319	**.843**	
UCESK	.174	.336	.425	.227	.420	.209	.358	-.040	.397	.358	.564	.600	.269	**.936**

Notes: Form.=formative construct
1-item= one item reflective construct
Diagonal value is square root of AVE for the observed construct

6.5.1.2. Assessment of formative measurement models

Convergent validity

The two indexes present in the first-step value co-creation path model (RESADJ, SERV) have demonstrated convergent validity (see Appendix 13).

Collinearity among indicators

Given that all formative indicators had values for TOL above .20 and values for VIF below critical value of 5, no severe collinearity problems were identified at this stage (see Table 60).

Table 60: Collinearity diagnostics for formative indicators with descriptives in the first-step value co-creation path model

Index	Item	μ	σ	CV	TOL	VIF
RESADJ	RESADJ_1	2.788	1.672	.600	.363	2.755
	RESADJ_2	2.139	1.501	.702	.243	4.122
	RESADJ_3	2.397	1.713	.715	.253	3.952
	RESADJ_4	2.967	1.798	.606	.264	3.791
	RESADJ_5	3.603	1.950	.541	.413	2.421
	RESADJ_6	3.238	1.875	.579	.292	3.424
	RESADJ_7	3.265	1.921	.588	.260	3.843
SERV	SERV_1	5.536	1.148	.207	.354	2.826
	SERV_2	5.702	0.965	.169	.276	3.621
	SERV_3	5.609	1.026	.183	.237	4.211
	SERV_4	5.536	1.176	.212	.302	3.311
	SERV_5	5.576	1.104	.198	.280	3.572
	SERV_6	5.616	1.188	.212	.368	2.719

Significance and relevance of outer weights

The RESADJ has lost 5 items due to insignificance and/or high collinearity (see Table 61). The removed items have a high degree of variability (see Table 60).

Table 61: Significance and relevance of outer weights in the first-step value co-creation path model

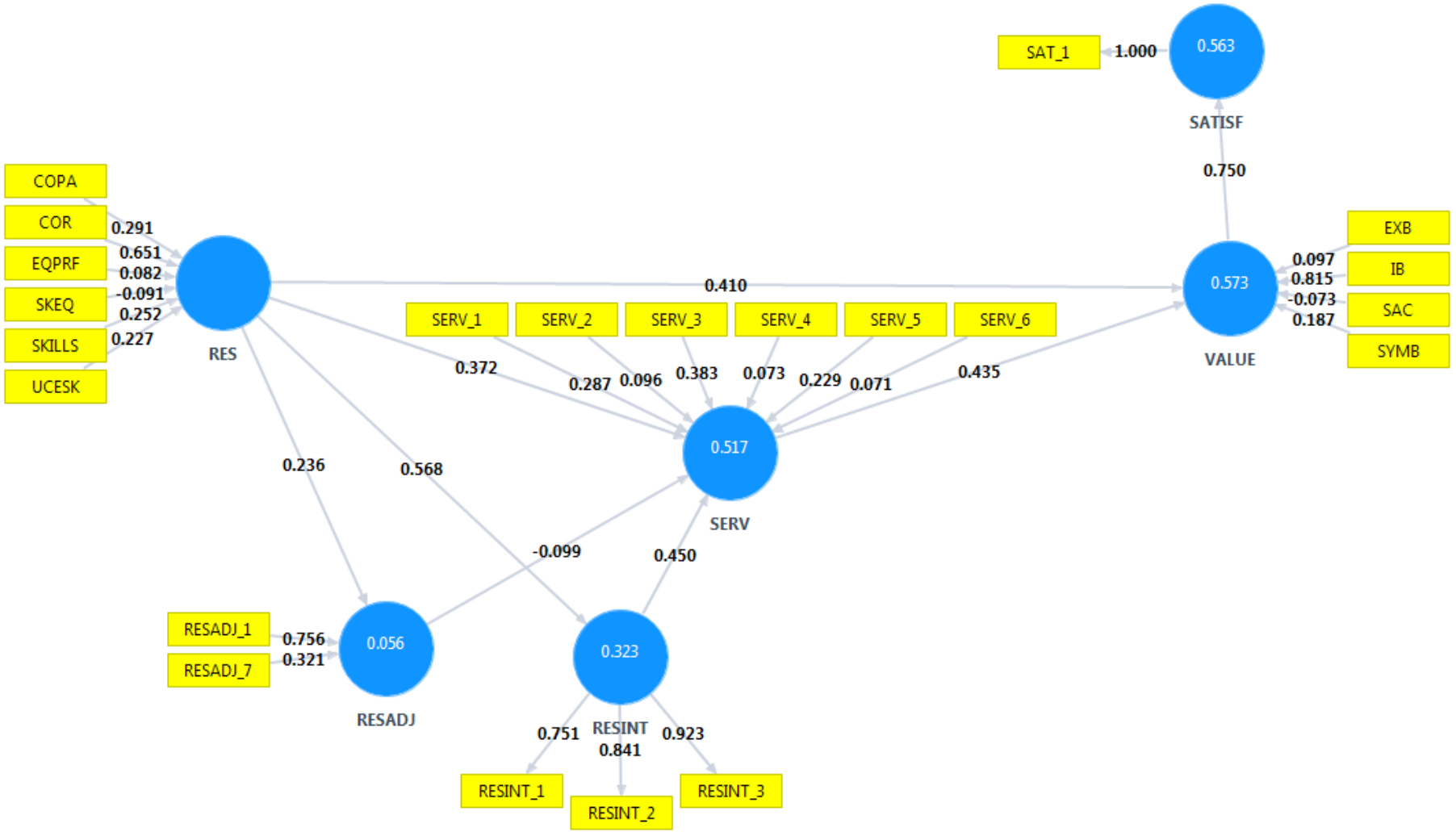
Index	Indicators	Outer weight	Outer loading	*t* value	*p* value	Sig. level α	Confidence interval[a]	Decision
RESADJ	RESADJ_1	.568	.258	1.704	.088	.10	[.018, 1.119]	Keep
	RESADJ_2	-1.103	-.436	3.303	.001	.01	[-1.654, -.552]	Remove due to high collinearity
	RESADJ_3	-.100	-.325	.353	.724	NS	[-.570, .369]	Remove due to insignificance
	RESADJ_4	.235	.142	.760	.447	NS	[-.275, .744]	Remove due to insignificance
	RESADJ_5	-.554	-.027	1.866	.062	.10	[-1.044, -.064]	Remove due to high collinearity
	RESADJ_6	.190	.290	.812	.417	NS	[-.196, .576]	Remove due to insignificance
	RESADJ_7	.700	.337	2.174	.030	.05	[.169, 1.231]	Keep
SERV	SERV_1	.269	.859	2.102	.036	.05	[.106, .432]	Keep
	SERV_2	.167	.874	1.732	.084	.10	[.011, .322]	Kepp
	SERV_3	.367	.927	2.253	.025	.05	[.236, .497]	Keep
	SERV_4	.046	.830	.481	.631	NS	[-.093, .184]	Keep due to high outer loading
	SERV_5	.268	.870	2.091	.037	.05	[.094, .442]	Keep
	SERV_6	.017	.758	.051	.959	NS	[-.128, .163]	Keep due to high outer loading

Notes: NS=not significant
a=Bootstrap confidence intervals with α=.10

6.5.2. Assessment of the second-step value co-creation path model

In the first-step value co-creation path model, indexes and scales were assessed and refined. Furthermore, latent scores obtained in the first-step model for the COPA, COR, EQPRF, SKEQ, SKILLS, and UCESK were assigned to RES, while EXB, IB, SAC and SYMB were assigned to VALUE as formative indicators (see Figure 15). The outcome of this procedure gave a parsimonious model of value co-creation. The rest of the section exercises a full path model evaluation. Latent scores for the model shown in Figure 15 are provided in Appendix 14.

Figure 15: Second-step value co-creation path model with estimated parameters



6.5.2.1. Assessment of reflective measurement models

Convergent validity and internal consistency

In the second-step value co-creation path model, the scales were found to have good psychometric properties. Namely, all of the reflective indicators had loadings above threshold value .70 and were significant at the .01 significance level. Each reflective indicator scored higher than .50 on the indicator reliability test, which implies that the underlying latent variable explains more than half of its observed reflective indicators' variance. Furthermore, all scales scored above .70 for AVE. According to the results obtained on loadings, indicator reliability and AVE it can be concluded that the scales and their reflective indicators have demonstrated convergent validity. Both composite reliability (CR) and Cronbach's α were significantly above threshold value of .70 confirming a very good internal consistency of scales (see Table 62).

Table 62: Convergent validity and internal consistency scale assessments in the second-step value co-creation path model

Scale	Inicators	Loadings	Indicator Reliability	AVE	CR	Cronbach's α	Discriminant validity
RESINT	RESINT_1	.751	.565	.708	.878	.794	Yes
	RESINT_2	.841	.707				
	RESINT_3	.923	.852				
SAT	SAT_1	1.000	1.000	1.000	1.000	1.000	Yes

Discriminant validity

Each of the 4 individual reflective items had the highest loading on the scales that were defined to belong to. Furthermore, the results of Fornell-Larcker test demonstrated that all of the scales are distinctive, meaning that they indeed measured and represented different latent phenomena. Details are provided in Appendix 12 (Cross-loadings) and Table 63 (Fornell-Larcker test).

Table 63: Discriminant validity test using Fornell-Larcker criterion for the second-step value co-creation path model

Scale	RES	RESADJ	RESINT	SAT	SERV	VALUE
RES	**Form.**					
RESADJ	0.236	**Form.**				
RESINT	0.568	0.070	**0.841**			
SAT	0.542	0.037	0.339	**1.000**		
SERV	0.604	0.020	0.654	0.551	**Form.**	
VALUE	0.673	0.099	0.504	0.750	0.683	**Form.**

Notes: Form.=formative construct
1-item= one item reflective construct
Diagnoal value is square root of AVE for the observed construct

6.5.2.2. Assessment of formative measurement models

Convergent validity

The four indexes (RES, VALUE, RESADJ and SERV) have demonstrated convergent validity (see Appendix 13).

Collinearity among indicators

Given that all formative indicators had values for TOL above .20 and values for VIF below critical value of 5, no severe collinearity problems were identified at this stage (see Table 64).

Table 64: Collinearity diagnostic for formative indicators in the second-step value co-creation path model

Index	Indicators	TOL	VIF
RES	COPA	.923	1.083
	COR	.755	1.325
	EQPRF	.681	1.467
	SKEQ	.542	1.844
	SKILLS	.523	1.910
	UCESK	.545	1.837
RESADJ	RESADJ_1	.549	1.822
	RESADJ_7	.549	1.822
SERV	SERV_1	.354	2.826
	SERV_2	.276	3.621
	SERV_3	.237	4.211
	SERV_4	.302	3.311
	SERV_5	.280	3.572
	SERV_6	.368	2.719
VALUE	EXB	.628	1.592
	IB	.590	1.696
	SAC	.899	1.113
	SYMB	.579	1.729

Significance and relevance of outer weights

From the list of the examined formative indicators several indicators had non-significant outer weights. In the case of RES these were EQPRF and SKEQ, but were anyway kept due to high outer loadings. In the case of RESADJ the indicators RESADJ_7 was non-significant but had high outer loading and therefore was kept. In the case of SERV the items SERV_2, SERV_4 and SERV_6 appeared not to be relatively important in explaining the SERV construct. However, they had absolute importance therefore were kept.

In the case of VALUE, EXB and SAC turned non-significant. However, the EXB was kept due to the high outer loading. The SAC was, same as in the case of value creation model, of negative sign and small magnitude (SAC= 2.166) but based on this sample the outer weight of SAC was non-significant (most likely because of the insufficient power due to the small weight and small sample, or due to high variability coefficient which might also indicate unexpected heterogeneity). So on this sample and in this context there it cannot be confirmed that SAC is a part of co-created value. However, the SAC will be kept in the VALUE construct and second-

step path model given that its presence makes no difference on further assessment. Speaking of dimensions of VALUE, the instrumental benefits (IB) appeared to have the highest relative importance, followed by less important symbolic (SYMB) and experiential benefits (EXB).

When speaking of resources (RES), consistently with the findings for customer's value creation model the contextual resources (COR) appeared as the most important resource. Second in importance among RES came contribution of participating actors (COPA) (see Table 65).

Table 65: Significance and relevance of outer weights in the second-step value co-creation path model

Index	Indicators	Outer weight	Outer loading	*t* value	*p* value	Sig. level α	Confidence interval[a]	Decision
RES (H_7)	COPA	.291	.484	3.603	.000	.01	[.158, .425]	Keep
	COR	.651	.854	7.735	.000	.01	[.512, .790]	Keep
	EQPRF	.082	.566	1.064	.288	NS	[-.045, .210]	Keep due to the high outer loading
	SKEQ	-.091	.475	.975	.330	NS	[-.246, .063]	Keep due to the high outer loading
	SKILLS	.252	.633	2.083	.037	.05	[.052, .452]	Keep
	UCESK	.227	.619	2.032	.042	.05	[.043, .411]	Keep
RESADJ	RESADJ_1	.756	.971	2.001	.045	.05	[.133, 1.379]	Keep
	RESADJ_7	.321	.828	.912	.362	NS	[-.260, .901]	Keep due to the high outer loading
SERV	SERV_1	.287	.865	2.465	.014	.05	[.095, .479]	Keep
	SERV_2	.096	.854	1.029	.303	NS	[-.058, .250]	Keep due to the high outer loading
	SERV_3	.383	.923	3.080	.002	.01	[.178, .588]	Keep
	SERV_4	.073	.844	.801	.423	NS	[-.077, .222]	Keep due to the high outer loading
	SERV_5	.229	.871	1.776	.076	.10	[.016, .442]	Keep
	SERV_6	.071	.778	.779	.436	NS	[-.079, .220]	Keep due to the high outer loading
VALUE (H_8)	EXB	.097	.632	1.297	.195	NS	[-.026, .220]	Keep due to the high outer loading
	IB	.815	.980	10.886	.000	.01	[.691, .938]	Keep
	SAC	-.073	-.152	1.368	.171	NS	[-.161, .015]	Reject
	SYMB	.187	.693	2.071	.038	.05	[.038, .336]	Keep

Notes: NS=not significant
a=Bootstrap confidence intervals with α=.10

6.5.2.3. Assessment of the value co-creation structural model

Assessing structural model for collinearity issues

The results provided in Table 66 show that there were no collinearity issues in the second-step value co-creation path model given that for all predictors TOL was well above .20 and VIF was well below the threshold value of 5.

Table 66: Collinearity diagnostic for the exogenous latent variables in the second-step value co-creation path model

Endogenous	Exogenous	Tolerance	VIF
SERV	RES	.647	1.546
	RESADJ	.941	1.063
	RESINT	.681	1.470
VALUE	RES	.635	1.575
	SERV	.635	1.575

Assessing the significance and relevance of the structural model relationships

The bootstrapping procedure showed that all of the inner path weights, but RESADJ→SERV, were significant (see Table 67). The insignificant path RESADJ→SERV had path weight of small magnitude probably have happened for the same reasons explained in the case of customer's value creation model.

Table 67: Significance and relevance of the structural model relationships in the second-step value co-creation path model

Paths	Path weight	*t* value	*p* value	Sig. level α	90% confidence interval
RES→RESADJ	.236	2.554	.011	.05	[.083, .388]
RES→RESINT	.568	8.717	.000	.01	[.461, .676]
RES→SERV (H_1)	.372	4.329	.000	.01	[.230, .514]
RES→VALUE	.410	5.944	.000	.01	[.296, .524]
RESADJ→SERV (H_2)	-.099	1.567	.117	NS	[-.204, .005]
RESINT→SERV	.450	5.270	.000	.01	[.309, .590]
SERV→VALUE (H_3)	.435	5.592	.000	.01	[.307, .563]
VALUE→SAT (H_5)	.750	15.184	.000	.01	[.669, .832]

Assessing the level of R^2

In the case of SERV, the model explained 51.7% of its variance which is according to the marketing studies using PLS-SEM considered to be a substantial amount of variance explained (Hair et al., 2014). Furthermore the model of value co-creation explains 57.3% or more than half of the total variance of VALUE which is more than satisfactory. The R^2 results imply that the model of value co-creation is well framed and has a very good explanatory capability for the focal constructs of service and value (see Table 68).

Table 68: R^2 of the endogenous latent variables in the second-step value co-creation path model

Endogenous construct	R^2	R^2_{adj}	Determination
RESADJ	0.056	0.049	weak
RESINT	0.323	0.318	moderate
SERV	0.517	0.507	substantial
VALUE	0.573	0.567	substantial
SAT	0.563	0.560	substantial

Assessing the effect sizes (f^2)

When speaking of SERV, RESINT is the most important predictor, followed by RES and RESADJ. In the case of VALUE, SERV is the most important predictive impact. SERV and RES have medium effect sizes (see Table 69).

Table 69: f^2 of the endogenous latent variables in the second-step value co-creation path model

Path	R^2 predictor included	R^2 predictor excluded	f^2	Size
RES→SERV	.517	.447	.145	medium
RES→VALUE	.573	.463	.258	medium
RESADJ→SERV	.517	.512	.010	small
RESINT→SERV	.517	.388	.267	medium
SERV→VALUE	.573	.483	.211	medium

6.5.2.4. Mediation effect

In total three mediations were hypothesised for the value co-creation path model:

1. RESADJ mediating RES→SERV (H_2);
2. RESINT mediating RES→SERV (H_3);
3. SERV mediating RES→ VALUE (H_6).

It was found that RESADJ is not a mediator of the RES→SERV relationship given that the compound path was insignificant. On the other hand RESINT and SERV were confirmed as mediators. RESINT appeared to be partial mediator of RES→SERV relationship thus definitely confirming that this process in nested in the process of service creation. The RESINT as mediator accounts for 42.33% of all explained variance in SERV. Furthermore, SERV was found to be mediator to RES→VALUE relationship and therefore it was proven that service co-creation is a process nested in value co-creation process. Or to be more precise – service co-creation precedes value co-creation. The SERV as mediator accounts for 39.87% of all explained variance in VALUE. Therefore, the structure RES→SERV→VALUE appeared, again to be a backbone of the value co-creation model (see details in Table 70).

Table 70: Assessment of the mediation effects in the second-step value co-creation path model

Step 1: Assessment of the significance of direct effects				
Direct Path	Direct path weight	*t* value	*p* value	Sig. level α
RES→SERV	.616	11.615	.000	.01
RES→SERV	.616	11.615	.000	.01
RES→VALUE	.676	15.551	.000	.01

Table 70 (continued): Assessment of the mediation effects in the second-step value co-creation path model

Step 2: Assessment of the significance of indirect effects							
Indirect (compound) path		Compound path weight	*t* value	*p* value	Sig. level α	VAF	Conclusion
(RES→RESADJ)x(RESADJ→SERV)	H_2	-.026	-.342	.732	NS	-4.30%	No mediation
(RES→RESINT)x(RESINT→SERV)	H_3	.258	4.341	.000	.01	42.33%	Partial mediation
(RES→SERV)x(SERV→VALUE)	H_6	.269	11.614	.000	.01	39.87%	Partial mediation

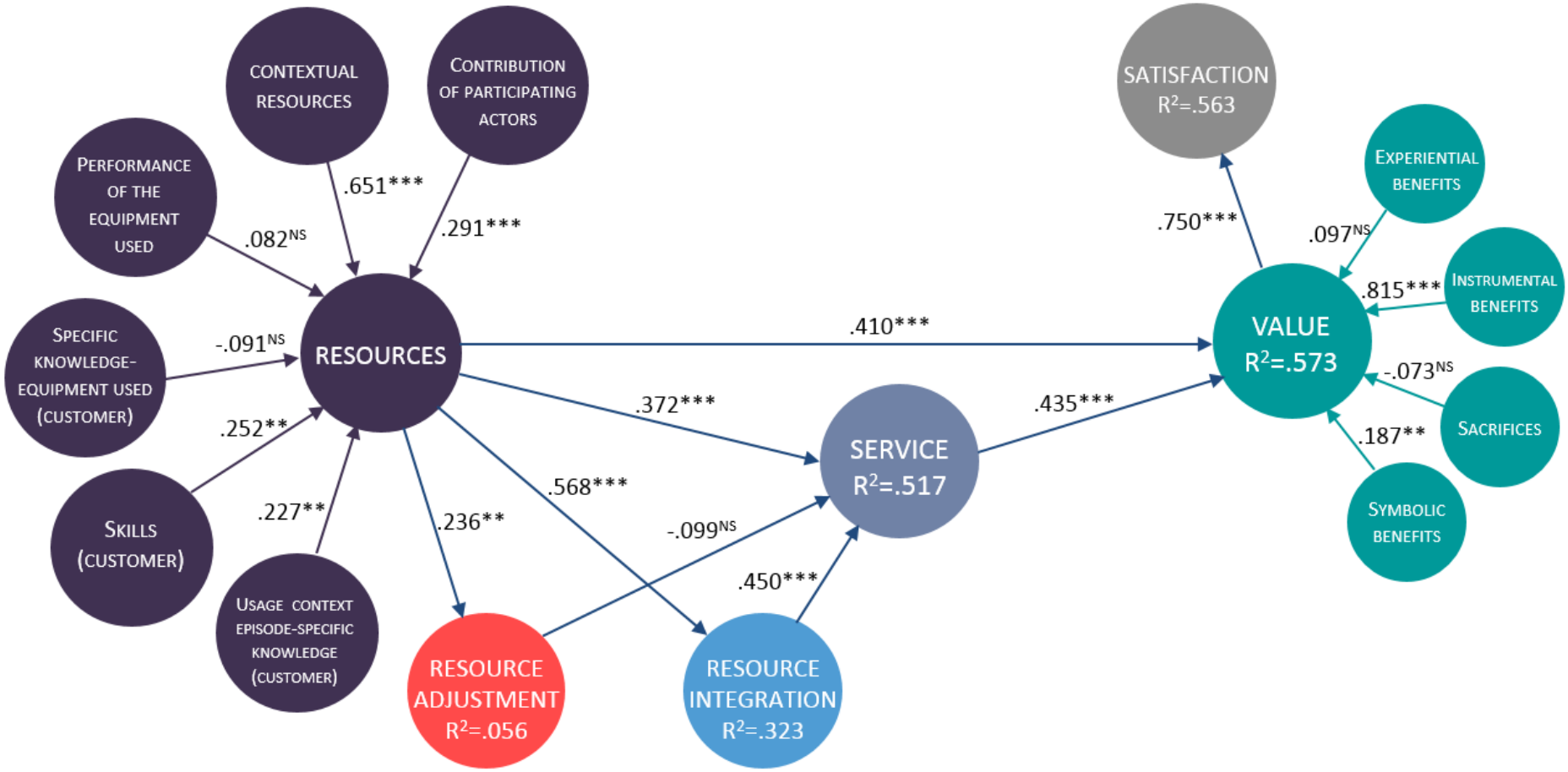
6.5.3. Findings for the model of value co-creation (Study 4d)

Section 6.5 examined the hypothesised path model of value co-creation. For this purpose, situations in which camera interacted with other actors were observed. The model was found to explain a substantial variance in the phenomena of SERV (R^2=.517) and VALUE (R^2=.573). 6 out of 8 hypotheses were confirmed (see Table 71) and one hypothesis was partially confirmed (H_8). Surprisingly, in the value co-creation model, SAC was found to be an insignificant part of VALUE. The most likely reason for this unexpected outcome is a small sample size with insufficient statistical power to confirm significance of a formative indicator with a small effect (problem of PLS-SEM bias). The rest of the findings are generally consistent with the findings for value creation path model. See further details in Table 71 and Figure 16.

Table 71: The summary of hypotheses with decisions for value co-creation path model

HYPOTHESIS		DECISION
H_1	THE BETTER THE RESOURCE PORTFOLIO EMPLOYED IN USE, THE BETTER THE CO-CREATED SERVICE. (RES→SERV)	CONFIRMED
H_2	THE MORE RESOURCE ADJUSTMENTS ARE PERFORMED THE BETTER THE SERVICE CREATED. RESOURCE ADJUSTMENT IS A TRANSFORMATIVE PROCESS THAT RESOURCES UNDERGO DURING THE PROCESS OF SERVICE CREATION. (RES→RESADJ→SERV)	NOT CONFIRMED
H_3	RESOURCE INTEGRATION IS A TRANSFORMATIVE PROCESS THAT RESOURCES UNDERGO DURING THE PROCESS OF SERVICE CO-CREATION. (RES→RESINT→SERV)	CONFIRMED
H_4	THE BETTER THE EMPLOYMENT OF RESOURCES INTO CREATED SERVICE, THE HIGHER THE CO-CREATED EPISODIC VALUE. (SERV→VALUE)	CONFIRMED
H_5	THE HIGHER THE CO-CREATED VALUE, THE HIGHER THE CUSTOMER'S SATISFACTION OF WITH THE CO-CREATED SERVICE. (VALUE→SAT)	CONFIRMED
H_6	SERVICE CO-CREATION IS A PROCESS NESTED IN THE PROCESS OF VALUE CO-CREATION. SERVICE MEDIATES THE TRANSFORMATION OF RESOURCES INTO VALUE. (RES→SERV→VALUE)	CONFIRMED
H_7	THE PORTFOLIO OF RESOURCES (RES) IN THE CONTEXT OF VALUE CO-CREATION CONSISTS OF CUSTOMER KNOWLEDGE (UCESK, SKEQ), CUSTOMER SKILLS (SKILLS), CONTEXTUAL RESOURCES (COR) AND THE EQUIPMENT USED (EQPRF).	CONFIRMED
H_8	VALUE IN THE CONTEXT OF VALUE CO-CREATION IS A MIX OF EXPERIENTIAL BENEFITS (EXB), INSTRUMENTAL BENEFITS (IB), SYMBOLIC BENEFITS (SYMB) AND SACRIFICES (SAC).	PARTIALLY CONFIRMED

Figure 16: Value co-creation model with path estimates and R^2 coefficients



Note: ***α=.01, ** α=.05, * α=.10, NS not-significant, R^2 – explained variance

6.6. Testing awareness of value creation and its impact on the customer's value creation process (Study 4e)

One of the research questions aimed to explore whether camera users are aware of their value creation roles (RQ4), how they define their roles, and whom they attribute the consumption outcomes (service, value) (RQ5) etc. A simple way to examine this was ask a question like the one provided in Table 72. For this study, the sub-sample from customer's independent value creation analysis was used given it has substantial size and its suitability for further splitting into sub-samples based on the categorical question provided in Table 72. It was found that almost 2/3s of camera users attributed the outcome of the camera usage to both the equipment used and themselves and thus perceive themselves as value co-creators (regardless of the absence/presence of other actors in the camera usage episode). 1/3 of camera users fully attributed the outcome of the camera usage to themselves (customers who perceive themselves as value creators). In the minority of cases (5%) camera users attributed the outcome to the camera only (customers who perceive themselves as value recipients).

Table 72: Value creation awareness/self-perception

UK (N=449)	VALID %	FREQUENCY
THE WAY MY PHOTOGRAPHS TURN OUT IS MOSTLY DOWN TO:		
me	31.6%	142
the equipment I use	4.9%	22
both me and the equipment I use	63.5%	285

To identify differences in the value and service creation behaviours of these three groups the sample had to be split. The numbers of observations for each of the three subsamples are given in Table 72 (frequency column). Unfortunately the sub-sample for 'value recipients' had only 22 observations and was, thus, of no use for the PLS-SEM model given that at least 70 observations were needed for the PLS-SEM model estimation following the 10 times rule. Therefore, it was decided to only compare whether value creators and value co-creators (placed in what is called in this doctoral study customer's value creation context) differed

with regards to value and service creation behaviour. These two subsamples are referred to as *VALUE CREATORS* and *VALUE CO-CREATORS* for the purpose of this analysis.

Keil et al. (2000) approach was used for the purpose of path and weight comparisons. The two models were estimated and compared against inner and outer path weights, as well as R^2 coefficients. The models appear to behave very similarly, and in terms of structure and explanatory power no major differences were discovered (see Table 73 and Table 74). However, in the case of value co-creators, the specific knowledge about equipment used (SKEQ) was significantly more important as an input resource to the process of value and service creation (see Table 75). However, in terms of resource adjustments value creators put more emphasis on adjusting camera settings while value co-creators placed far more emphasis on setting up everything else. This implies that they prefer manual settings and thus attribute the outcome of camera usage to themselves.

Table 73: Path comparison for value creators and value co-creators in the context of customer's value creation

	Value creators (n=142)		Value co-creators (n=285)					Sig. level
Paths	path weight (p_1)	se(p_1)	path weight (p_2)	se(p_2)	$\lvert p_1-p_2 \rvert$	*t* value	*p* value	α
RES→RESADJ	.270	.076	.318	.060	.048	.484	.628	NS
RES→RESINT	.562	.063	.488	.054	.074	.896	.371	NS
RES→SERV	.422	.104	.451	.071	.029	.228	.819	NS
RES→VALUE	.466	.105	.414	.049	.052	.447	.655	NS
RESADJ→SERV	.015	.045	-.079	.046	.093	1.454	.147	NS
RESINT→SERV	.342	.108	.351	.079	.009	.066	.947	NS
SERV→VALUE	.344	.102	.457	.055	.113	.983	.327	NS
VALUE→SAT	.746	.053	.753	.032	.007	.110	.912	NS

Table 74: Comparing explanatory capability (R^2) of models for value creators and value co-creators in the context of customer's value creation

Endogenous construct	Value creators (n=142) $R_{1\ adj}^2$	Value co-creators (n=285) $R_{2\ adj}^2$	$\lvert R_{1\ adj}^2-R_{2\ adj}^2 \rvert$
RESADJ	.073	.101	.028
RESINT	.316	.238	.078
SERV	.463	.453	.010
VALUE	.533	.607	.074
SAT	.557	.567	.010

Table 75: Comparing formative indicators weights in models for value creators and value co-creators in the context of customer's value creation

	Value creators (n=142)		Value co-creators (n=285)					Sig. level
Paths	path weight (p_1)	se(p_1)	path weight (p_2)	se(p_2)	$\lvert p_1-p_2 \rvert$	*t* value	*p* value	α
COR→RES	.678	.092	.525	.079	.153	1.267	.206	NS
EQPRF→RES	.089	.095	.160	.070	.071	.589	.556	NS
SKEQ→RES	-.023	.075	.251	.092	.274	2.326	.021	0.05
SKILLS→RES	.155	.091	.279	.087	.124	.992	.322	NS
UCESK→RES	.315	.124	.096	.078	.220	1.567	.118	NS
RESADJ_1→RESADJ	.825	.261	.062	.176	.763	2.435	.016	0.05
RESADJ_7→RESADJ	.239	.243	.956	.204	.717	2.268	.024	0.05
SERV_1→SERVICE	.294	.157	.212	.101	.082	.455	.649	NS
SERV_2→SERVICE	.153	.183	.176	.114	.024	.109	.913	NS
SERV_3→SERVICE	-.190	.188	.113	.099	.302	1.428	.155	NS
SERV_4→SERVICE	.234	.150	.173	.104	.061	.337	.736	NS
SERV_5→SERVICE	.439	.163	.329	.133	.110	.524	.600	NS
SERV_6→SERVICE	.185	.127	.131	.092	.054	.338	.735	NS
EXB→VALUE	.162	.089	.184	.065	.021	.192	.848	NS
IB→VALUE	.822	.076	.735	.051	.086	.963	.336	NS
SAC→VALUE	-.096	.073	-.069	.040	.027	.325	.746	NS
SYMB→VALUE	.085	.069	.224	.053	.139	1.554	.121	NS

Finally, it can be concluded that, indeed, customers differ in the way how they perceive their roles in value creation process. This appears not only to be a perceptual phenomenon. Rather, it has its effects on the value creation practices, as demonstrated in this chapter. However, further research on this matter is required.

The following chapter provides discussion and conclusion, opportunities for further research as well as limitations and practical implications of the findings given in this doctoral research.

7. Discussion and conclusion

This doctoral research started with an extensive historically organised review of GDL, SDL and SL marketing literatures focusing on value and value creation (see Chapter 2) with the aim of providing a systematic and thorough understanding of value and value creation in marketing science, and with the aim of clearly outlining the existing theory gaps in SDL/SL literature (see Table 7).

When it comes to the value literature, reviewed in Chapter 2, the following was found. When compared to GDL, SDL brought a systematic theoretical shift in arguing firstly that value is not contained in goods and services per se but rather in their application/use (Vargo and Lusch, 2004a) and secondly that value creation is not an exclusive function of manufacturers but a shared suppliers-customers activity – the co-creation (Vargo and Lusch, 2008a). SDL brought more emphasis on consumers and customers, which are argued to be of central importance to both marketing scholars and practitioners (Kotler and Keller, 2012). Despite its provision of a truly alternative logic of marketing, SDL was generally criticised by SL to be more of a metaphor (Grönroos, 2012) or a grand theory, lacking explicit theorisation (Leroy et al., 2013) and relevance for practitioners (Brodie, 2014). These criticisms were most likely a consequence of having an all-encompassing concept of value co-creation which has been argued to hamper theoretic progress (Gummerus, 2013; Grönroos and Gummerus, 2014). Contrary to SDL, SL set clear boundaries on what can be considered under value co-creation, while deliberately arguing that not all socio-economic actors act as value co-creators by default (Grönroos and Voima, 2013). According to this view, value co-creation is one form of value creation that requires direct interaction between at least two parties, of which at least one has to be customer (Grönroos, 2011b; Grönroos and Gummerus, 2014). This clear distinction between value co-creation and customer's independent value creation was established by SL's founder Grönroos (2011b) who found logical flaws in SDL's foundational premises – in particular a conflict between FP7 (*The enterprise/supplier cannot deliver value, but only offer value propositions*) and FP6 (*The customer is always a co-creator of value*). Essentially, if value is always co-created between multiple parties, than FP6 indirectly implies that the supplier is a value co-creator as well as the prefix 'co-' points to collaboration and interaction between at least two parties, and the question becomes how can a supplier co-

create something they cannot deliver (Grönroos, 2011b). Therefore, according to SL, without an interaction with the customer, a supplier can act only as a value facilitator. Hence, when customers are on their own, the process of value creation takes an alternative form of value creation – the customer's independent value creation (Grönroos, 2011b). In this case customers act as value creators, while suppliers take on the roles of value facilitators.

SDL as a 'zoom-out' or grand theory (Brodie, 2014; Leroy et al., 2013) together with a relatively small number of empirical studies (Echeverrii and Skålén, 2011) rendered value creation a 'black box' (Grönroos, 2009, 2011b; Leroy et al., 2013). The few empirical studies providing value co-creation models (see Moeller, 2008; Aarikka-Stenroos and Jaakkola, 2012; McColl-Kennedy et al., 2012; Payne et al., 2008) generally endorse the supplier-centric view of value creation or focus on the customer-supplier dyad. This implies that SDL and SL still continue to see value creation from the supplier's perspective, thus, failing to thoroughly understanding customers, their value creation practices and their understanding of value-in-use. A customer-centric view of value-in-use and value creation is still much needed in the SDL and SL literatures (Saarijärvi et al., 2013; Grönroos and Voima, 2013). Hence, this doctoral research represents an empirical attempt to contribute to the explanation of the theoretical issues that are explicitly articulated through five research questions:

RQ1: Should the definition of value-in-use within the context of SDL/SL include sacrifice elements?
RQ2: How is the value creation process affected by different actors and different resources?
RQ3: What is the anatomy of the value creation process in the specific research context examined?
RQ4: Are all customers aware of their role in value creation?
RQ5: What impact does this awareness have on the value experienced in use?

Finally, this research was an attempt to create a mid-range theory that bridges theory and practice and facilitates understanding of value and value creation from customer point of view. Therefore, this research employs the much needed customers perspective in understanding what value is, what the anatomy of value creation is and how customers see their roles in value creation process. The final issue in particular has generally been ignored in both SDL and SL literatures.

The findings are based on one qualitative (exploratory) and two quantitative (confirmatory) studies conducted in the context of camera usage that have facilitated understanding of the focal issue of value creation. The findings will now be discussed in the light of the current theoretical knowledge, the theoretical contribution will be outlined and subsequently the recommendations for the future research, alongside with limitations and managerial implications will be provided.

7.1. Discussion of findings and theoretical contribution

All empirical studies were focused on customer's value creation practices in the context of the customer controlled camera usage sphere (as urged by Grönroos and Gummerus, 2014; Vargo and Lusch, 2012; Heinonen et al., 2010; Sandström et al., 2008; Arnould et al., 2006; Payne et al., 2008). The value creation process was observed in the form of usage episodes which appeared to be particularly useful in setting the boundaries of research observations. This approach was aligned with Roggeveen et al. (2012), Verhoef et al. (2009) and Kleinaltenkamp et al.'s (2012) view on value as an episodic phenomenon. The empirical research was approached in a literature-informed manner but using the research tools that were capable of identifying, and subsequently confirming, phenomena beyond currently available knowledge. Namely, the initial exploratory qualitative Study 1, based on 29 in-depth semi-structured interviews of camera users of various backgrounds and profiles (see Table 16), enabled the identification and exploration of important theoretical concepts that were omitted from the current SDL/SL literature.

In Study 1, and later on in quantitative Studies 4c and 4d, it was confirmed that value creation has a structure comprising inputs, phases and outputs (see Figure 3, Figure 12 and Figure 16). The dynamic *customer-resources-actors* structure was found to be an input to the value creation process. Consistent with the view of Håkansson et al. (2009), resources were confirmed to be the basis of interactions between individual actors in value creation process. However, the *customer-resources-actors* input is clearly not fixed (Vargo and Lusch, 2012), but rather dynamic, given that it can be modified or altered during the course of value creation. This can occur through the inclusion, exclusion or alteration of resources and/or

actors, in particular during the resource selection phase of value creation. When it comes to resources, in this doctoral research, the default operand/operant resource classification proposed by Vargo and Lusch (2004a) was further classified according to the resource type to illustrate specificities of the camera usage context. In this case these resources were identified as: customer's *usage context episode specific knowledge* (Bettencourt et al., 2002; Hilton and Hughes, 2013), customer's *specific knowledge about equipment used* (Maglio and Spohrer, 2008; Kleinaltenkamp et al., 2012; Sandström et al., 2008; Bettencourt et al., 2002), customer's *skills* (Vargo and Lusch, 2004a), *equipment performance* (Olaru et al., 2008; Sandström et al., 2008; Fischer et al., 2010), *contribution of participating actors* (Olaru et al., 2008; Vargo et al., 2008; Arnould et al., 2006) and *contextual resources* (Vargo, 2008, 2009; Helkkula et al., 2012; Edvardsson et al., 2011; Heinonen, 2004; Pihlström and Brush, 2008; Pura, 2005; Vargo et al., 2010; Chandler and Vargo, 2011; Edvardsson et al., 2012). This particular resource classification perpetuated the measurement of the quality and quantity of resources, which was useful in confirmatory studies. In addition this classification approach could also be seen to be useful for both practitioners and scholars who aim to establish the relative importance of different resources in the value creation process. Studies 4c addressing customer's independent value creation and 4d addressing value co-creation not only confirmed the presence and importance of the resources identified in Study 1, but have also demonstrated their relative importance for service and value creation. Studies 4c and 4d differed according to whether other actors (customers, suppliers etc.) were present or not – which resulted in the assessment of the two different models simply due to the reason that inputs in the value creation were inherently different[47]. Findings of confirmatory studies 4c and 4d showed that in the context of camera usage contextual resources as operand (and generally public) resources (such as light, ambiance, scenery, moments, atmosphere etc.) play a crucial role for service and value creation. In terms of relative weight, they are at least twice as important as any other input resource. This confirms the view of a number of scholars (see Grönroos and Gummerus, 2014; Karababa and Kjeldgaard, 2013; Chandler and Vargo, 2011; Vargo et al., 2010; Vargo, 2008; Edvardsson et al., 2011; Helkkula et al., 2012; Edvardsson et al., 2011; Epp and Price, 2011; Gummesson, 2006; Grönroos and Voima, 2013) that emphasise the importance of the context to the extent of renaming the value-in-use as value-in-context (Chandler and Vargo, 2011) by way of emphasising its crucial role.

[47] Resources as a second order formative construct employed in studies 4c and 4d has different meaning/definitions in the context of customer's independent value creation and value co-creation. Thus, it had to be evaluated in separate models pertinent to adequate contexts

When present in a value creation episode, other participating actors (for the sake of model parsimony and reduction of the questionnaire length this was conceptualised as *contribution of participating actors*) are perceived as the second most important resource in value creation. This also emphasises how powerful and influential the physical presence of other value co-creation actors is on value creation outcomes. Exactly this finding (i.e. the relative importance of the contribution of participating actors) can serve as evidence to empirically support Grönroos'es (2011b) ideas that theory should distinguish between customer's independent value creation and value co-creation. The high importance of participating actors (in this case regarded as an operant resource) demonstrates that Grönroos (2011b) was most likely right in his belief that the interaction between actors in co-creation is important because actors can influence the flow or dynamics of value co-creation and, thus, influence the co-created value. Surprisingly, the equipment performance has appeared to be the least important (Study 4c) or even an insignificant input resource (study 4d). This was not expected, especially given that the equipment is regarded as the 'carrier of operant resources' (Löbler, 2013; Peters et al., 2014) and, in this case, the critical service enabler (without a camera there is no photograph). This can be potentially explained by paraphrasing one of the participants in Study 1 – it is not what the equipment can do, it is what you can do with the equipment. The finding illustrates how important it is for companies to understand how significant other resources (complementary to those supplied by company/manufacture) are for value creation. Finally both studies 4c and 4d provided strong evidence to confirm that the quality of the employed portfolio of resources has a significant role in the outcomes of service and the value creation process.

The current literature describes value creation as a range 'activities' (Vargo, 2008) with somewhat fragmented ideas about what these are (see Kleinaltenkamp et al., 2012; Moeller, 2008; Aarikka-Stenroos and Jaakola, 2012; McColl-Kennedy et al., 2012; Payne et al., 2008). Some even argue that value creation is a 'black box' (Grönroos, 2011b; Leroy et al., 2013). However, this study has offered a more systematic and data-driven understanding of the specific activities and phases involved in value creation. The findings are consistent with the views of Moeller (2008), Aarikka-Stenroos and Jaakkola (2012) and Payne et al. (2008) in a sense that value creation is seen as a multistage process. The following five phases of value creation were identified in Study 1: (1) *usage episode initiation*, (2) *resource selection*, (3) *resource adjustment*, (4) *resource integration* and (5) *evaluation*. *Episodic learning* was not

directly included in value creation given that this process happens either in the value creation background or between value creation episodes. Episodic learning is found to generally inform subsequent customer activities. Thus, it appears in the conceptual model but is excluded from the actual processes of service and value creation in the quantitative studies. Contrasting with previously existing models of value (co-)creation, the model proposed in this doctoral research, shown in Figure 3, provides an explicit structure for the value creation process flow, inputs and outputs. Phases 1–4 comprise the service creation process that Studies 1, 4c and 4d have strongly confirmed to be nested processes within the value creation process. Each of the value creation phases (service creation together with phase 5) will be briefly explained.

Usage episode initiation is the moment when the customer progresses into actual consumption and starts the value creation episode. The episode can be triggered internally (by a customer) or externally (by actors, resources, events). The outcome of the initiation process is a goal, or agenda for the particular consumption episode. In the light of this finding it is suggested that value creation is a goal driven process, which agrees with the work of Gummerus and Pihlström (2011) and Epp and Price (2011). Once the goal is created and the consumption episode has started, the customer selects resources by themselves or though interactions and negotiations with other actor(s). This happens in a process stage called the resource selection phase, where a customer decides which resources to employ. This phase was also identified in studies by Liu and Cai (2010), Payne et al. (2008) and Aarikka-Stenroos and Jaakkola (2012). In this phase value-in-exchange can emerge in cases when a customer has to purchase or rent a resource needed for use. The output of the resource selection phase is a resource set that is selected for usage, and in the case of an exchange, value-in-exchange. The chosen resource set can then be subject to a resource adjustment phase, which involves the manipulation, arrangement and/or modification of resources in the resource set. The resource adjustment process is performed not to create service but rather to optimise the resources for subsequent integration. This value creation phase is a novel, distinct construct that has not been specifically identified in previous SDL and SL literatures. That said, previous literature has recognised resource adjustment-like activities using different labels – *resource combination* (Moeller, 2008), *resource organising* (Aarikka-Stenroos and Jaakkola, 2012), *resource customisation* (Cova and Salle, 2008) or *resource preparation* (Payne et al., 2008). However, these studies do not clearly distinguish these activities from resource integration. Both the empirical findings and the literature

recognised that resources can be configured, customised, combined, arranged and manipulated prior to being integrated into the final effect (service). Thus, the findings of the qualitative study suggest that there is an activity that involves the manipulation and/or arrangement of resources that precedes resource integration. This is an important finding that suggests two important new understandings. First, resource integration is not the only phase of value creation in which operations on resources are being performed and second, resource integration should not be regarded as the value creation process itself (see Hilton and Hughes, 2013; Kleinaltenkamp et al., 2012). However, despite the strong evidence from the qualitative Study 1, the quantitative studies 4c and 4d were not successful in confirming resource adjustment as a distinct phase in value creation. Three potential reasons are posited to explain what might have rendered resource adjustment an insignificant mediator of the conversion of resources into service in the confirmatory studies. First, it might have happened due to unexpected heterogeneity, namely different adjustment modes might result in different levels of significance for the resource adjustment construct. A second contributor could be suboptimal operationalization of the concept (most likely the quality of adjustments would work better instead of measuring the quantity of adjustments). Third, the relative higher importance of resource integration as mediator of resources' conversion into value may have rendered resource adjustments an insignificant mediator. The available data indicates partial explanation of this problem. Namely, resource adjustments could be performed by the customer and/or actors through manual settings, by the equipment through auto settings or jointly by the customer, actors and equipment through semi-auto settings. In these three different situations the level of performed adjustments was confirmed to be significantly different, as demonstrated in Appendix 15. This might imply that the resource adjustments is phenomeologically different and plays a different role, depending on which actor or operant resource is performing the adjustments. Further analysis on this matter would require developing and testing 6 further value creation models (studies 4c and 4d are required to be split into further 3 sub-models each to address this problem). Despite problems with confirming resource adjustments as a value creation phase, looking at the magnitudes of the latent scores of resource adjustments in studies 4c and 4d, it is clear that it would be wrong to conclude, based on this data and the problems listed above, that this construct is theoretically insignificant (see Appendix 11 and Appendix 14). The resource adjustments activities are definitely being performed in the usage of photographic equipment and should not be rejected as a phase of the value creation

process. Therefore, further empirical and theoretical endeavours are needed to refine and potentially confirm this value creation phase.

The output of the resource adjustment phase is an adjusted resource set that is subject to resource integration, where the resources are deployed to create an effect, which in this study are the photographs. In this case, the resource integration is generally considered an irreversible process because the resources integrated into service cannot be fully broken down into the original constituent resources. In this particular research context, resource integration is the moment when the shutter button is pressed. This action is an outcome of a decision that the resources being applied are sufficiently/optimally adjusted for resource integration. However, unlike some of the more recent views (see Peters et al., 2014, Hibbert et al., 2012) the data suggests that resource integration does not have to directly and necessarily result in value. These two constructs, namely service and value, are mediated by an evaluation phase, where a customer evaluates the service, the eventual side-effects of the service creation process, the resource set used, the adjustments applied and the entire service creation process. That is, a customer makes a global evaluation of the entirety of the value creation process with its inputs and outputs. Thus, only once everything was experienced and cognitively and emotionally evaluated (Heinonen et al., 2010) can a customer understand and realise value-in-use. In this particular context, as shown by the empirical data, resource integration results in photographs that can be stored in the memory of a digital camera (or other storage devices) for later evaluation. This suggests that the evaluation does not necessarily have to be simultaneous with the creation, but can happen sometime later.

Finally, consistent with Smith and Colgate's (2007) value operationalization, value-in-use was generally confirmed to be a four-dimensional construct that consists of *instrumental benefits*, *symbolic benefits*, *experiential benefits* and *sacrifices*. Whereas the qualitative study enabled the identification of the elements of value-in-use, the quantitative studies enabled the determination of the magnitudes and relative importance of these components to the holistic value-in-use experience. All benefits (including instrumental, experiential and symbolic benefits) had positive loadings on value, with the instrumental benefits being the most important. The instrumental benefits imply that, in general, customers seek photographs that are aesthetically and technically successful and that can be shown to

others. Experiential benefits included the benefits drawn from the experience of taking a photograph, including fun, excitement, socialising etc. Symbolic benefits showed how well the photograph(s) supported a customer's perception of their self-identity, personal meaning, self-expression, social and conditional meaning. This was seen to be especially important in the context of social networks, where customers can evaluate, comment and share uploaded photographic content. Interestingly, the sacrifice dimension of value was confirmed by studies 1 and 4c and this is consistent with the few other SL empirical studies that have confirmed sacrifice as a dimension of value-in-use (see Gummerus and Pihlström, 2011; Mohd-Any et al., 2014). In this case, the sacrifice dimension includes customer's mental and physical efforts, opportunity costs, frustration, and money spent. The sacrifice component, as expected, had a small and negative loading. This implies that taking photographs is a low-sacrifice activity, most likely because camera users can repeat their shots if a photograph turn out poorly. However, in the value co-creation model, the sacrifice component was statistically insignificant. This could, however, be due to the relatively small sample (n=151) and insufficient statistical power needed to determine statistically significant small loadings. Therefore, value-in-use in the context of value co-creation should be tested on a larger sample in order to be able to draw firmer conclusions about the relevance and significance of the sacrifice component in the co-creation context.

Explaining value creation through episodes emphasised the dynamic nature of value (Voima et al., 2011a; Grönroos and Voima, 2013). Namely, after each usage episode, a customer is more knowledgeable and more experienced, thus increasingly capable of better understanding the consumption process. This dynamic was captured through the process of episodic learning. This learning expands a customer's knowledge and skills and influences their subsequent value creation approach by making them more effective in their value creation activities (Hibbert et al., 2012). The knowledge, accumulated through usage episodes, is most likely one of the reasons why customers occasionally upgrade their equipment and alter their usage practices.

In opposition to Payne et al.'s (2008) view, but consistent with Roggeveen et al. (2012), it was found that the value creation process is not linear, but rather cyclical and non-linear, showing how unpredictable the unique value creation path of an individual customer can be. It was also found that customers can revisit any of the previously visited value creation

phases identified in the model (see Figure 3 and Appendix 3). This indicates that a value creation episode can evolve in unique ways depending on the sequence of value creation phases. However, the model indicates that there are some rules to how this can happen, i.e. in which direction any regression and progression can go. In this way, while the model acknowledges the idiosyncrasies of individual customers' approaches, on the other hand, it provides a theoretically structured view of this inherently idiosyncratic process.

The models of customers' independent value creation and value co-creation have demonstrated a very good explanatory power for service and value-in-use. Compared to Ranjan and Read 's (2014) study, the models proposed in this doctoral research have significantly higher explanatory power of value-in-use, explaining 57% of the explained variance of value-in-use versus 38% in the study by Ranjan and Read (2014). When it comes to service, the explained variance ranges from 43% in the model of customer's independent value creation to 52% in the model of value co-creation. Observing these values of explained variance, it can be concluded that the value creation models were solidly build and generally explain more than half of the variance of the focal constructs. However, there is significant space for improvement, which can be a task for the future research.

Finally, this research attempted to explore how customers perceive their roles in value creation. Scholars argue that value is always *co-created* (Vargo and Lusch, 2012) or sometimes independently *created* by customers (Grönroos, 2011b). Namely, it was found in studies 1 and 4e that customers differ according to how they understand and perceive their roles in value creation. Some see themselves as the ultimate *value creators,* that is they attribute the outcome of value creation to themselves exclusively, some as *value co-creators* who attribute the outcome of value creation to themselves and the equipment used, and yet others who see themselves only as *value recipients,* who attribute the outcome of value creation to the equipment exclusively. This perception of their value creation roles has a subsequent influence on value creation dynamics. For example, the models of value creation for *value creators* and *value co-creators*[48] appeared to behave very similarly, and in terms of structure and explanatory power no major differences were identified. However, in the case of *value co-creators,* knowledge about the equipment used was significantly more important

[48] These are self-perception categories in this case

as an input resource to the process of value creation. However, when it came to resource adjustments, value creators put more emphasis on adjusting equipment, while value co-creators placed far more emphasis on setting up the other resources relevant for taking photographs. These behavioural differences between different value creation awareness levels should be considered as an important area for further research on the impact of customer value creation awareness (self-perception) on the dynamics of value creation, as it is seen to offer an interesting area of study that was not considered by the current SDL/SL literature.

7.2. Recommendations for future research

Even though this research has shown that it was particularly useful to employ an episodic view on value creation, this approach might have provided a static and situational understanding of value-in-use and value creation. In this light, future research could establish a longitudinal study of value creation that will follow customers through multiple usage episodes in order to better acknowledge the dynamic nature of value-in-use (Day and Crask, 2000; Van der Haar et al., 2001; Voima et al., 2011; Grönroos and Voima, 2013) and explore value-in-use dynamics as a function of the time lapse, altered context, altered resources and customer's augmented experience, knowledge and skills.

Even though this doctoral research recognises the need to study the roles of participating actors in value co-creation, it recognises them only in the form of an input resource, which is a rather simplified view. This approach, unfortunately, took out of the focus an important customer-actor interaction aspect of the value co-creation that is argued to be very important (see Grönroos and Gummerus, 2014, Grönroos 2011b). Further research could expand and further explore the already proposed value co-creation model with more details on the resources participating actors bring, as well as the activities they solely or jointly provide in the customer-supplier shared sphere. Furthermore, the models can be tested depending on whether participating actors are profit driven or not.

Further research could also explore models of value creation and value co-creation that allow for value creation phase revisits/regression i.e. the cyclical structural model of value

creation. The cyclical nature of value creation (Aarikka-Stenroos and Jaakkola, 2012) could not be explored in Studies 4c and 4d given that the PLS-SEM method allows only for unidirectional, non-recursive model paths (Hair et al., 2014). The task for further researchers would be to find ways to build and test recursive models of value creation, as indicated by qualitative model shown in Figure 3.

Further research should also conduct work on refining the multi-item constructs that were utilized in the confirmatory studies. In particular further operationalization and refinement of the resource adjustment construct is needed. It could be alternatively operationalised to capture quality of adjustments and it is also worth exploring if each resource type needs and/or requires a differently operationalised resource adjustment construct. Also, further studies need to obtain bigger samples so that resource adjustment can be tested across resource adjustment situations. In the context of camera usage these are situations when adjustments are performed in manual, semi-automatic and automatic modes.

Finally, further research could test the model in other consumption contexts, especially those that are not self-service technology and conduct further work so that future models offer more variance explained in the focal constructs of service and value-in-use.

7.3. Limitations

Even though a number of quantitative and qualitative empirical studies were conducted with the aim of taking advantage of triangulation and, thus, increasing the reliability of the findings, this doctoral research has several limitations. The main one lies in the fact that all the empirical studies looked at a single consumption context, namely the usage of digital cameras. The specificity of this context is that one particular product, namely a digital camera, can be used repeatedly over time without complete resource destruction and is also a self-service technology. The findings indicate that this consumption context is a low-sacrifice one, where customers have the ability to engage in trial and error (i.e. if a photograph does not turn out well, in many cases, camera users can repeat the shot). However, having an option to engaging in trial and error with a very small risk or sacrifice is not the case in all consumption contexts, like travelling, taking holiday at a particular destination, cooking etc. These consumption contexts are different to camera usage because revisiting the resource adjustments and resource integration phases requires some sacrifice on the part of the customer. For example, if the holiday destination was not a good choice, making subsequent modifications and readjustments in the course of the holiday, if possible at all, would most likely be costly in terms of money, time and stress. If a cooked meal does not turn out well, new ingredients have to be bought, a customer has to eat what is prepared or go hungry. However, in the context of camera usage, if a photograph is not good, the camera user can try again by readjusting resources. Thus, the findings may be applicable only to research contexts similar to camera usage, which is by no means a narrow field and actually products like this occupy significant space in the everyday lives of customers (i.e. usage of computers, mobile phones and other electronic devices, cars, computer software, smart watches – i.e. the technologies that allow for trial and error in use without resource destruction). Therefore, testing of the proposed definitions and models of value and value creation in the context of other types of products (i.e. products that can be used or consumed only once, non-technical products etc.) and especially services (i.e. banking, leisure etc.) is recommended.

In terms of sampling and data collection, in all cases (except in the qualitative research) online samples from English-speaking countries were used. Even though it is assumed that users of digital cameras are likely to have a computer and an internet connection, and even

though the penetration of the internet is very high in the observed countries (USA and UK), it is still questionable whether the results obtained from a non-internet population of camera users would be the same as those provided in this thesis. The study used mTurk and online panels that generally attract people who actively seek financial compensation for taking part in surveys as a source of additional income (Callegaro, Baker, Bethlehem et al., 2014). In this light, this means that the sample can be potentially biased toward lower income online population, and might also exclude a population of camera users who do not have an internet connection or have internet connection but are not enrolled in panels or crowdsourcing websites. Therefore, it would be interesting to have a sample of internet users and camera owners who are not member of online panels and crowdsourcing platforms. Also, it would be beneficial to explore how the value creation model performs in non-English speaking countries with different cultures. Therefore, a wider study of camera users is needed.

Another limitation concerns the small sample size, which did not allow for further exploration of underlying heterogeneity, especially in terms of different adjustment modes and different value creation awareness types. Larger samples would be beneficial in further explorations of these issues. Also empirical studies applied non-recursive SEM approach PLS-SEM, which does not allow for testing recursive relationships (Hair et al., 2014) that are possible in value creation (see Figure 3). Therefore, it has to be acknowledged that confirmatory studies, due to the limitation of the PLS-SEM method, did not take into consideration potential revisits of the value creation phases but rather observed value creation in a linear unidirectional fashion.

7.4. Managerial implications

In an applied discipline such as marketing, a good theory should be able to assist practice and practitioners, either in achieving better results or in a better understanding of the phenomena of interest (Lewin, 1951, Hunt, 1992). This study provides a step toward making SDL/SL applicable and useful in marketing practice by showing how a value creation mechanism can be studied in a given context. There are several broad managerial implications stemming from the new knowledge provided by this doctoral research.

First, the way this study was designed and conducted provides ideas for practitioners about how to examine value and the value creation process in the context of the usage of their products or services. The models have strong predictive ability for value and can serve as a tool to gain insight into the mechanism of value creation. This insight can empower practitioners to understand consumption from the perspective of customers in a more thorough and holistic fashion. It can also help them to develop ways to enable customers to create (or co-create) higher value-in-use, by helping them to understand how to handle the most critical resources for the success of service and value creation. Namely, the customer's value creation and value co-creation models provide an applied framework that can be used to establish the antecedents of value, even at the level of individual customers. For example, a supplier can identify that a particular piece of equipment is not appropriate for the usage context and suggest upgrades, or can ascertain that a camera user lacks knowledge of resource adjustments, for which the supplier could help by providing customer education or helping them develop skills. Therefore, the models could, in general, serve as a diagnostics platform to help manufacturers of photographic equipment to identify critical problems on an individual consumption level and supply resources that are critical for customers' value creation.

Second, by learning about customers' behaviour and activities in the value creation process, suppliers may be able to establish new interaction points, to understand what resources to supply and when to suggest upgrades and to support customers in getting optimal consumption experiences from the offerings consumed or used. For example, in this study, contextual resources i.e. light, ambiance, scenery etc. were found to be perceived as resources of primary importance for the quality of photographs. Therefore, manufacturers

could provide more guidelines to customers on how to choose a good photographic context or how to get the most out of different contexts and situations. Those mentioned in the study for example involved night, fast-moving objects and direct sunlight etc. Improving customers' knowledge of this would most likely lead to the creation of higher value, and consequently to a higher level of satisfaction. Furthermore, when present in a value creation episode, other participating actors including suppliers are perceived as the second most important resource in value creation. This also emphasises how powerful and influential the physical presence of other value co-creation actors on value creation outcomes is. This indicates that suppliers should take advantage of face-to-face engagement/interaction with customers in order to improve customer's experiences and assist them in co-creating the optimal value. Alternatively, in the era of the internet and mobile communications, manufacturers could develop intelligent systems that scan the context parameters and, based on the available equipment, advise customers what to do (how to position themselves, what adjustments to apply, or potentially what piece of equipment to add or upgrade). Thus, marketers and manufacturers would have a range of opportunities to be involved in an ongoing dialogue and collaboration with customers and, thus, shift their role from value facilitators to value co-creators and finally create more value-in-use jointly with customers. This would lead to a higher level of customer satisfaction and stronger customer-supplier relationships (customer loyalty). Interestingly, the findings showed that the photographic equipment has the lowest impact on the service and value created. The finding illustrates how important it is for companies to understand how significant other resources (complementary to those supplied by company/manufacture) are for value creation. So instead of pursuing a production-oriented philosophy of marketing, companies should follow a more customer-centric marketing approach and offer a platform for customers to develop their knowledge and skills so that customers can become empowered in their value creation activities.

Third, practitioners could use customers' awareness of their role in value creation as a new market segmentation criterion, or as a tool that will help companies determine how to market products and interact with customers who have different perceptions of their own roles in value creation. For example, customers who perceive themselves as value creators are most likely self-driven and appear to be active in learning about photographic equipment. Satisfying their thirst for knowledge and equipping them with resources for value creation would be a helpful way forward for practitioners. Marketing communications could

focus on the *value creator's* creativity and capability, and present the company as an organisation that can take this further. On the other hand, the minority of customers who perceive themselves to be value recipients should be offered equipment with good auto-settings and straightforward usage. Otherwise, *value recipients*, faced with any negative or frustrating experiences in the course of usage not stemming from the properties of the camera itself, are likely to attribute these experiences to the manufacturer and, potentially, get involved with customer service or complaints.

Finally, photographic equipment manufacturers and marketers might avoid emphasising the technical aspects of their equipment (such as megapixels or zoom), given that this empirical study has shown that equipment performance is attributed the lowest importance in the resource portfolio. Instead, marketers could experiment with emphasising what kind of usage context the camera can be successfully used in (i.e. low light, or situations in which the customer has to react fast and does not have time to manually configure everything). These recommendations might resonate with wider groups of camera users, given that upscale equipment, such as DSLR, is becoming increasingly used even by the general customer population (see BBC, 2014).

To sum up, based on the knowledge provided in this doctoral research, practitioners and suppliers should be better able to identify and recognise the critical variables (resources and actors) for value creation in the customer consumption setting in which the company's supplied resources are used. Also, understanding value creation from the customer's perceptive can help practitioners to identify opportunities to engage with customers in ways that could result in more effective value creation through the provision of a supportive infrastructure that will empower customers in their independent value creation (particularly in cases where customer-supplier interactions are not possible or not wanted by customers). Finally, suppliers could potentially test and use a new market segmentation criterion based on customers' perceptions of their role in value creation, thus, trying to tailor their marketing communications and offers to better suit different market segments based on the value creation awareness.

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Appendix 1: Value (co-)creation models

Exhibit 1: Resource integration framework (Kleinaltenkamp et al., 2012: 202)

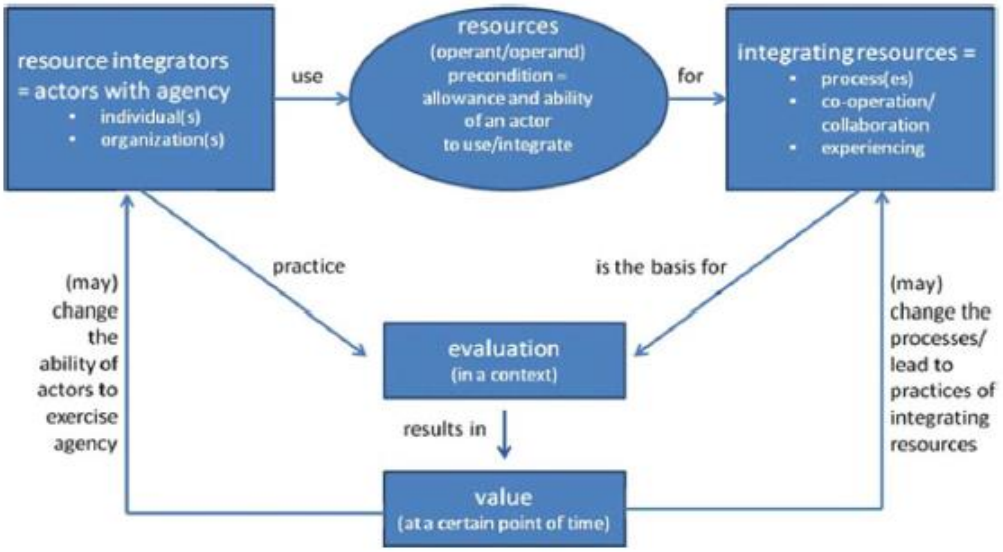


Exhibit 2: FTU Framework: Stages of Service Provision (Moeller, 2008: 198)

	Facilities	Transformation	Usage
Indirect service provision	1 *Resources perspective:* company resources act as prerequisite to any transformation *Decision perspective*: company autonomous decisions *Value perspective*: facilities only exhibit potential value for customers	2a **Company-induced transformation** *Resources perspective*: companies act as prime resource integrators. Transformation is induced by companies and includes only company resources. The transformation intends to end with a marketable good. *Decision perspective*: company autonomous decisions *Value perspective*: company-induced transformation only exhibits potential value for customers	3 *Resources perspective*: customers act as prime resource integrators and operant resources producing effects *Decision perspective*: customer autonomous decisions *Value perspective*: customers act as co-creators of value-in-use: a) customers benefit from company-induced transformation (2a) by consuming a good (distribution mechanism) b) customers benefit from customer-induced transformation (2b)
Direct service provision		2b **Customer-induced transformation** *Resources perspective*: companies act as prime resource integrators. Transformation is induced by customers integrating their resources (as operand resources) and acting as co-producers and co-creators *Decision perspective*: integrative decisions for customers and companies *Value perspective*: customer-induced transformation can exhibit value in transformation for customers, customers act as co-producers and co-creators of value	

Exhibit 3: Joint problem solving as value co-creation in knowledge intensive services (Aarikka-Stenroos and Jaakkola, 2012: 22)

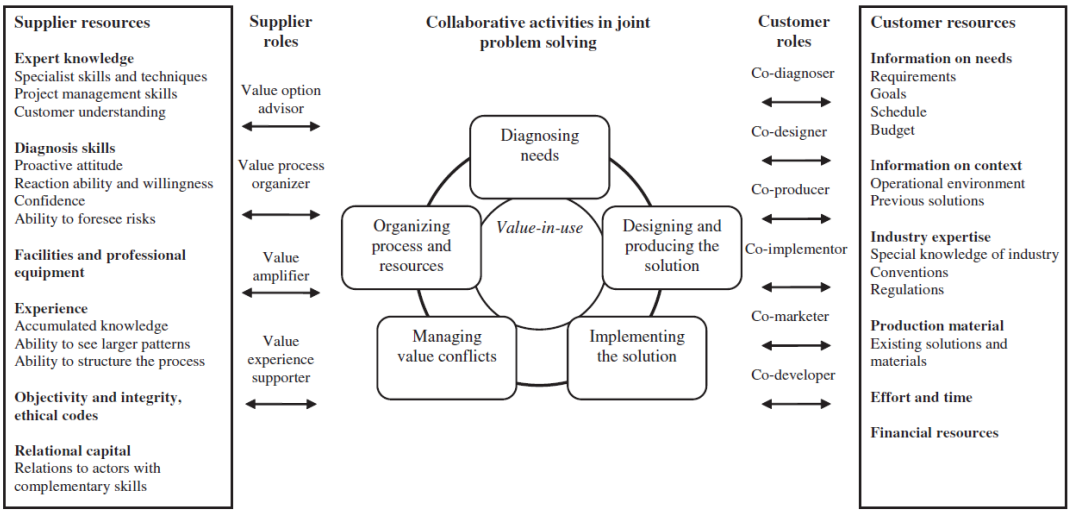


Exhibit 4: Customer value co-creation practice styles (McColl-Kennedy et al., 2012)

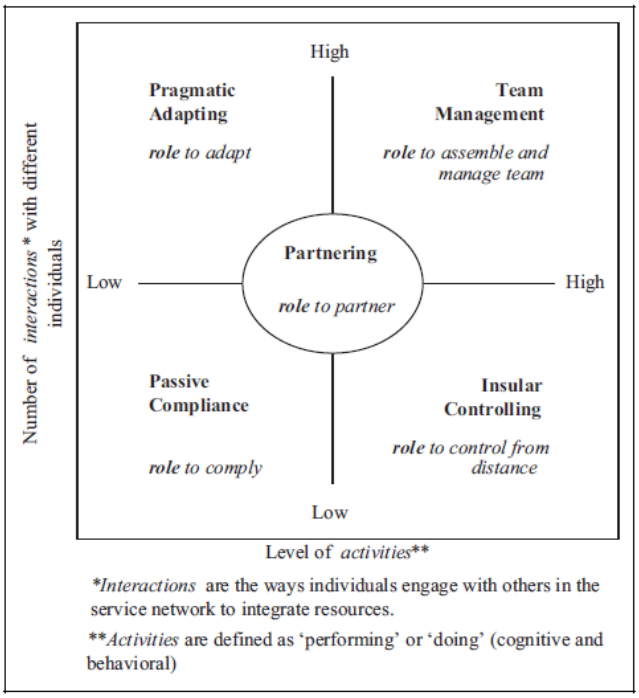


Exhibit 5: Mapping of customer, supplier and encounter processes (Payne et al., 2008: 92)

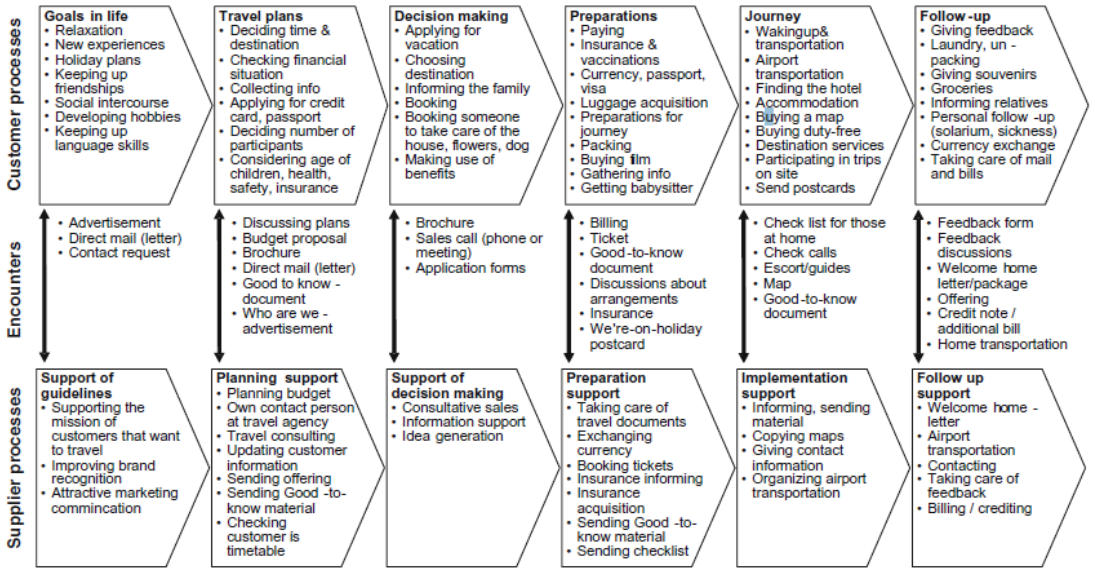
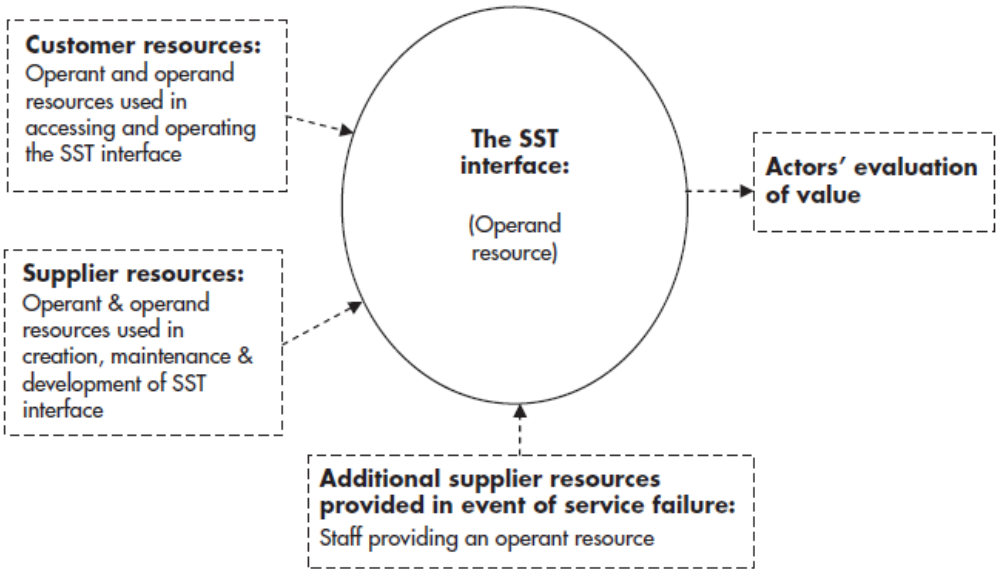


Figure 2 Mapping of customer, supplier and encounter processes.

Exhibit 6: Model of resource integration using self-service technology (Hilton and Hughes, 2013: 867)



Appendix 2: Photographic glossary

This glossary is adopted from Hedgecoe (2008) and updated with Ang (2011).

ANALOGUE – Non-digital recording system in which he strength of the signal is in direct proportion to the strength of the source

APERTURE – Opening in the lens that helps to restrict how much light reached the film or image sensor. In most cameras, the size of aperture is adjustable. The aperture setting used has an important role to play in both exposure and depth of field. Also aperture is the lens setting that controls the amount of light entering the lens of the camera (Ang, 2011).

AUTOFOCUS – System in which the lens is adjusted automatically by the camera to bring the image into sharp focus

BACKGROUND – The bottom layer of a digital image; the base (Ang, 2011).

BULB SETTING – shutter speed setting on a camera that allows photographer to keep the shutter open for as long as the trigger release is press down. Used for providing exposures that are seconds or minutes long

BRACKETING – Way of ensuring the right exposure by taking a sequence of pictures with a slightly different exposure setting for each. Taking a range of shots and deliberately under- and overexposing in order to find the best exposure (Ang, 2011).

BRIGHTNESS – A quality of visual perception that varies with the amount or intensity of light.

COLOUR BALANCE – The relative strengths of colours in an image (Ang, 2011).

CONTRAST – A measure of difference between the lightest and darkest parts of an image (Ang, 2011).

COMPACT – camera that has a shutter mechanism built into the lens. Compact cameras are generally point-and-shoot designs that are easy to carry around

DEPTH OF FIELD – Measure of how much of picture is in focus, from the nearest point in the scene to the camera that looks sharp, to the furthermost point that looks sharp. Depth of field is dependent on the aperture used, the distance at which that lens is focused, and the focal length of the lens

DIFFUSER – Any material that scatters the light as it passes through it. A diffuser softens the light, making it less directional, so shadows are less marked

DSLR – digital single lens reflex. Type of camera in which the viewfinder image shows the subject through the same lens that will be used to expos the fill or imaging chip; uses a mirror to reflect image to the viewfinder, which moves out of the way when picture is taken

ELECTRONIC VIEWFINDER – An LCD screen, viewed under an eyepiece, showing the view through the camera lens (Ang, 2011).

EXPOSURE – total amount of light used to create image. It can be varied by adjusting the aperture of the lens and the duration of the exposure (Ang, 2011).

F NUMBER/STOP – aperture setting. The number is the focal length of the lens divided by the diameter of the aperture. For this reason, larger f number represents smaller aperture sizes. F numbers are used so that exposure settings for a particular scene can be expressed independent of the focal length actually used

FAST LENS – lens that has a wider than usual maximum aperture for that particular focal length or zoom range. Fast lenses are useful in lowlight, and capable of throwing backgrounds more out of focus than is usually possible

FILTER – transparent attachment that fits in front of a lens or a light source, which modifies the light or the image in some way

FIXED FOCUS LENS – lens with no focus adjustment, as used on low-cost compact cameras

FLASH – (1) to illuminate with a very brief burst of light. (2) Equipment used to provide a brief burst of light. (3) Type of electronic memory used in, for example, digital cameras (Ang, 2011).

FLASH SYNCHRONISATION – process by which the peak output from the flash bulb coincides with the shutter being fully open. With cameras using focal plane shutter, the shutter speed must be chosen with care to ensure that flash synchronisation is achieved

FOCAL LENGTH – distance between the optical centre of a lens and its focal point. In practice, the focal length is a measure of the magnification and angle of view of a given lens or zoom setting. It is usually measured in millimetres

FOCAL POINT – point at which parallel lines of light entering a lens converge

FPS – frames per second. Measurement of the continuous shooting rate of a camera system

FULL FRAME – size of sensor used by some professional digital SLRs, measuring around 36x24mm. The image size is the same as that of 35mm film, so no crop factor necessary

HDR – high dynamic range. A digital imaging technique in which a series of identical pictures of a scene are taken at different exposure brightnesses and then combined into one image. This provides detail in shadow and highlight the areas that is not usually seen, and is particularly useful in high-contrast subjects, such as landscapes, interiors, and night scenes

ISO – (International Standard Organisation) Scale used for measuring the sensitivity of a digital sensor film

LIGHT GRAFFITI – Photograph where camera is set for a long exposure while someone who stands in front of camera uses a source of light to draw or write something, leaving light trace on the photograph captured

MACRO – Term used to describe equipment or facility that allows you to take pictures at a closer shooting distance than usual, to provide bigger image. Macro usually refers to a recorded image of life-size or larger with a magnification ratio of 1:1 or greater

MANUAL EXPOSURE – exposure mode in which both aperture and shutter speed are set by camera user

MEGAPIXEL – measurement of the resolution of a digital camera, equal to one million pixels

MIRROR LOCK – facility that allows you to lock the mirror of an SLR camera in the up position in advance of the picture being taken. This minimizes vibration when the shutter is fired. Useful when using slow shutter speeds, for examples

NOISE – unwanted interference in an electrical signal. Seen as grain-like pattern in dark areas of digital image. Noise increases with a digital camera when a higher image sensitivity (or ISO setting) is used

PANNING – Moving the camera horizontally during exposure to follow a moving subject si that it stays roughly in the same place in the viewfinder

PIXEL – Short for picture element. A single light-sensitive cell in a digital camera's image sensor. The basic unit used when measuring the maximum resolution of a digital camera or a digital image

PIXELATED – digital image in which its individual picture elements have become visible as squares of colour, usually due to poor resolution or over enlargement of the original image

POLARIZER – filter that lets through only light vibrating in one plane. It can be used to deepen the colour of part of a picture, such as the sky. It can be also used to reduce reflections from non-metallic surfaces such as water or glass. It must be rotated to get the desired effect

PRIME LENS – Non-zoom lens with a single fixed focal length

RAW – a file format offered by all recent digital SLRs and other high-end digital cameras. Image data is stored in a semi-processed state and needs to be fully processed on a computer. It enables colour balance, exposure and other settings to be adjusted after the picture is taken without any loss of image quality

RESOLUTION – ability of a lens, film, or digital imaging device to record fine detail

ROLL FILM – type of sprocketless film that has an opaque paper backing, and is supplied on an open spool. It is wound on to another spool in the camera, the original spool becoming the take-up spool for the next roll of film. General term for the 120 and 220 film used by medium-format cameras

RULE OF THIRDS – Compositional approach in which key elements are deliberately placed off-centre within the frame

SHUTTER LAG – the delay between pressing the trigger of a digital camera and the picture actually being recorded. This delay can be frustratingly lengthy with older and lower-cost digital models

SHUTTER PRIORITY – semi-automatic exposure system in which the shutter speed is set by the photographer, and the aperture is set by the camera to suit the measured light level readings taken by the camera's metering system

STOP – Unit of exposure. A change of a single stop is equal to doubling or halving the amount of light reaching the film or image sensor

TRIPOD – three-legged camera support

WIDE-ANGLE LENS – lens with a wider-than-usual angle of view. For full-frame digital SLRs or 35mm SLRs, it is a lens offering a focal length of 17mm or less

WHITE BALANCE – system by which a digital camera measures the colour temperature of a light source and corrects it so that the whites, and all the other colours, appear normally to the human eye

ZOOM – Lens with a variable angle of view

Appendix 3: Revisiting the value creation phases

The pre-pilot study was used for the preliminary questionnaire testing and was based on an international convenience sample of 353 people. A multiple response question was designed to test for revisiting instances between the value creation phases (see Figure 3). This was done in order to see whether revisiting variants in the Figure 3 that had no empirical support in qualitative findings exist in a bigger sample. The following four revisits were of particular interest: (1) from the resource selection phase to the initiation phase (2→1); (2) from the resource adjustments phase to the episode initiation phase (3→1); (3) from the resource adjustments phase to the resource selection phase (3→2); and (4) from the evaluation phase to the resource integration phase (5→4). As the data show these regressions/revisits, indeed occur in the real life camera usage situations (see valid % column). Therefore, all the revisit paths in the qualitative model of value creation were confirmed.

Table: Revisiting the value creation phases

THINKING OF YOUR MOST RECENT CAMERA USAGE, PLEASE TICK ALL THAT HAPPENED UNTIL THE MOMENT YOU FINALLY SWITCHED OFF CAMERA.	PATH	VALID %	FREQUENCY
Given the available equipment, I had to redefine my initial idea	(2→1)	13.7%	48
When I started adjusting everything, I changed my initial idea	(3→1)	13.7%	48
When I started adjusting everything, I decided to use other/more/less equipment	(3→2)	10.0%	35
Once I shot the photo, I came up with a new idea	(4→1)	46.9%	164
Once I shot the photo, I changed equipment	(4→2)	6.6%	23
Once I shot the photo, I changed settings	(4→3)	54.3%	190
Once I saw the photo I took, I got a new idea	(5→1)	48.6%	170
Once I saw the photo I took, I changed equipment	(5→2)	7.1%	25
Once I saw the photo I took, I made different adjustments	(5→3)	58.6%	205
Once I saw the photo I took, I shot again, keeping everything the same	(5→4)	43.7%	153

Appendix 4: Results of individual FA

In all of the 12 individual FA it appeared that the sampling was adequate. KMO was well above the required minimum of .60 and Bartlett's test was in all cases significant indicating the existence of a factor solution. The next step was to examine the inter-item correlations, corrected item-to-total correlations and communalities, which identified a number of problems. Some of the items did not show good statistical properties and were removed from the individual factorial solution. Namely, reflective item RESINT_4 had a low inter-item correlation, and once it was removed RESINT's explained variance increased to 62.4% and the Cronbach's α increased to .800. The other reflective item that was removed was SAC_2 from the SAC scale. SAC_1 and SAC_3 had communalities below .40. Furthermore, SAC_1 and SAC_3 also had low item-to-item correlations with SAC_2. After carefully considering the evidence it was found that SAC_2 caused the low communalities. Once it was removed, the items under SAC scale performed according to the required statistical criteria and had good inter-item correlations and corrected item-to-total correlations. SAC's explained variance increased from 53.63% to 55.13%. The rest of the results showed that all scales, observed separately, have good psychometric properties. As expected in each individual FA, the results showed the existence of only one underlying factor, thus confirming the hypothesised unidimensionality of the scales at the individual level. Scales also demonstrated high reliability given that the Cronbach's α of the final individual factor solutions ranged from .80 to .92, which is considerably higher than the required minimum of .70. Based on these results it was concluded that the scales were well designed at an individual level. Tables provide details of the individual FA and remark in table bottom explains which items were removed, for what reasons, and how the removal of these items affected the explained variance and Cronbach's α.

Table 1: Results of the individual FA

Construct	Items	Bartlett's sphericity test	KMO	Inter-item correlations <.05	Communalities	Corrected item-to-total correlation	Factor Loadings	Variance explained	Cronbach's α
SKILLS	SKILLS_1	χ^2=1,886.71 df=10 p=.000	.872		.797	.848	.893	69.9%	.913
	SKILLS_2				.629	.745	.793		
	SKILLS_3				.458	.647	.677		
	SKILLS_4				.780	.833	.883		
	SKILLS_5				.830	.855	.911		
UCESK	UCESK_1	χ^2=1,027.45 df=3 p=.000	.751		.700	.792	.837	77.5%	.910
	UCESK_2				.826	.841	.909		
	UCESK_3				.798	.832	.893		
EQPRF	EQPRF_1	χ^2=1,301.07 df=6 p=.000	.764		.400	.603	.633	67.0%	.884
	EQPRF_2				.768	.797	.876		
	EQPRF_3				.819	.820	.905		
	EQPRF_4				.691	.780	.831		
SKEQ	SKEQ_1	χ^2=1,046.86 df=6 p=.000	.808		.710	.770	.843	63.9%	.866
	SKEQ_2				.712	.752	.844		
	SKEQ_3				.430	.615	.656		
	SKEQ_4				.705	.758	.840		
COR	COR_1	χ^2=1,699.04 df=10 p=.000	.857		.437	.630	.661	66.3%	.905
	COR_2				.629	.753	.793		
	COR_3				.737	.803	.859		
	COR_4				.700	.790	.837		
	COR_5				.811	.843	.901		
COPA	COPA_1	χ^2=203.85 df=3 p=.000	.711		.590	.693	.768	65.5%	.838
	COPA_2				.563	.673	.750		
	COPA_3				.811	.770	.901		

Table 1 (continued): Results of the individual FA

Construct	Items	Bartlett's sphericity test	KMO	Inter-item correlations <.05	Communalities	Corrected item-to-total correlation	Factor Loadings	Variance explained	Cronbach's α
RESR	RESR_1	χ^2=795.517 df=3 p=.000	.717		.717	.765	.850	70.4%	.871
	RESR_2				.717	.805	.915		
	RESR_3				.717	.694	.742		
RESINT	RESINT_1	χ^2=721.984 df=6 p=.000	.692	RESINT_4	.703	.689	.839	51.4%	.776
	RESINT_2			RESINT_4	.365	.553	.604		
	RESINT_3				.791	.727	.889		
	RESINT_4			RESINT_1, RESINT_2	.195	.402	.442		
IB	IB_1	χ^2=1,231.90df=10 p=.000	.877		.516	.671	.718	56.0%	.873
	IB_2				.638	.732	.799		
	IB_3				.594	.715	.771		
	IB_4				.567	.697	.753		
	IB_5				.683	.757	.826		
EXB	EXB_1	χ^2=2,219.69 df=15 p=.000	.863		.412	.626	.642	64.9%	.907
	EXB_2				.728	.789	.853		
	EXB_3				.751	.795	.867		
	EXB_4				.608	.737	.780		
	EXB_5				.625	.770	.790		
	EXB_6				.767	.821	.876		

Remark: RESINT_4 deleted due to low inter-item correlations. Consequently, variance explained increased to 62.4% and Cronbach's α increased to .800

Table 1 (continued): Results of the individual FA

Construct	Items	Bartlett's sphericity test	KMO	Inter-item correlations <.05	Communalities	Corrected item-to-total correlation	Factor Loadings	Variance explained	Cronbach's α
SYMB	SYMB_1	χ^2=2,188.59 df=15 p=.000	.898		.601	.741	.775	66.9%	.922
	SYMB_2				.546	.710	.739		
	SYMB_3				.791	.849	.889		
	SYMB_4				.577	.729	.760		
	SYMB_5				.762	.827	.873		
	SYMB_6				.739	.815	.860		
SAC	SAC_1	χ^2=2,240.96 df=28 p=.000	.894	SAC_2	.397	.621	.630	53.6%	.893
	SAC_2			SAC_1, SAC_3, SAC_4	.431	.605	.656		
	SAC_3			SAC_2	.389	.615	.624		
	SAC_4			SAC_2	.482	.659	.694		
	SAC_5				.675	.764	.821		
	SAC_6				.648	.742	.805		
	SAC_7				.568	.688	.754		
	SAC_8				.700	.764	.837		
VALUER	VALUER_1	χ^2=1,465.14 df=10 p=.000	.867		.597	.726	.773	63.8%	.897
	VALUER_2				.559	.702	.747		
	VALURE_3				.688	.774	.830		
	VALUER_4				.743	.802	.862		
	VALUER_5				.602	.725	.776		

Remark: SAC_2 deleted due to low inter-item correlations. Consequently, explained variance increased to 55.1% and Cronbach's α decreased to .885

Appendix 5: Norstat panel characteristics

Panel size: 67,000 with a net reach of 16,000 nationally representative completes (age and gender)
Average UK response rate: 25%
Maximum workload per panellist: 6 surveys per month
Recruitment into panel: by invitation only
Sampling: stratified probability (age & gender) sampling using *natrep* sampling matrix
Quality standards: ISO 26362
Professional membership: ADM, DGOF, BVM and ESOMAR

	PANEL	POPULATION
GENDER		
Male	34%	49%
Female	66%	51%
AGE		
14-29	24%	25%
30-39	19%	16%
40-49	21%	18%
50-59	19%	15%
60+	17%	27%
REGIONS		
Greater London	9%	13%
South East	16%	14%
South West	9%	9%
West Midlands	8%	9%
North West	12%	11%
North East	5%	4%
Yorkshire and Humberside	8%	9%
East Midlands	8%	7%
East of England	11%	9%
Wales	3%	5%
Scotland	9%	8%
Northern Ireland	2%	3%

Data obtained through email correspondence with: Ms Mina Odavic and Mr Jan Raabe from Norstat.

Appendix 6: CFA item descriptives with normality tests and collinearity diagnostics

Table 1: CFA item descriptives with normality tests and collinearity diagnostics

Items	μ	σ	SI	KI	Tolerance	VIF
SKILLS_1	4.140	1.315	-.352	-.046	.232	4.311
SKILLS_2	4.112	1.362	-.282	-.295	.322	3.108
SKILLS_3	4.587	1.361	-.425	-.003	.403	2.483
SKILLS_4	4.428	1.199	-.392	.614	.216	4.620
SKILLS_5	4.170	1.201	-.324	.322	.216	4.626
UCESK_1	4.795	1.311	-.690	.338	.295	3.393
UCESK_2	4.745	1.356	-.688	.128	.232	4.304
UCESK_3	5.002	1.239	-.768	.735	.221	4.519
EQPRF_1	5.017	1.488	-.826	.192	.444	2.251
EQPRF_2	4.473	1.473	-.376	-.170	.239	4.182
EQPRF_3	4.808	1.369	-.534	.256	.218	4.586
EQPRF_4	4.830	1.417	-.565	.125	.318	3.141
SKEQ_1	4.965	1.322	-.709	.454	.245	4.074
SKEQ_2	5.082	1.323	-.700	.348	.279	3.590
SKEQ_3	4.412	1.502	-.435	-.267	.426	2.348
SKEQ_4	5.380	1.199	-.838	1.176	.302	3.309
COR_1	5.488	1.143	-.704	.466	.385	2.601
COR_2	5.428	1.165	-.787	.900	.287	3.490
COR_3	5.075	1.319	-.645	.174	.195	5.133
COR_4	5.348	1.191	-.584	.249	.281	3.558
COR_5	5.217	1.243	-.822	.780	.202	4.957
RESR_1	4.575	1.128	-.592	.145	.195	5.130
RESR_2	4.612	1.100	-.583	.280	.184	5.438
RESR_3	4.530	1.148	-.392	-.047	.342	2.928
RESINT_1	5.340	1.261	-.964	1.138	.445	2.246
RESINT_2	5.825	.978	-.760	.769	.443	2.257
RESINT_3	5.637	1.091	-.927	1.263	.340	2.937

Note: μ – item mean; σ – item standard deviation; SI – skewness index, KI – kurtosis index, VIF – variance inflation factors

Table 1 (continued): CFA item descriptives with normality tests and collinearity diagnostics

Items	μ	σ	SI	KI	Tolerance	VIF
IB_2	5.532	1.174	-.919	1.068	.343	2.917
IB_3	5.005	1.581	-.780	.052	.327	3.062
IB_4	5.833	1.164	-1.314	2.194	.323	3.093
IB_5	5.402	1.330	-1.044	.962	.288	3.467
EXB_2	6.007	1.054	-1.245	2.250	.207	4.838
EXB_3	5.875	1.144	-1.141	1.647	.216	4.637
EXB_4	5.277	1.437	-.658	-.023	.313	3.194
EXB_5	5.545	1.356	-.832	.357	.250	3.992
EXB_6	5.595	1.244	-.814	.552	.204	4.892
SYMB_1	5.118	1.334	-.584	.126	.348	2.872
SYMB_2	4.850	1.431	-.433	-.207	.326	3.070
SYMB_3	4.677	1.499	-.460	-.177	.275	3.638
SYMB_4	4.990	1.399	-.594	.205	.363	2.757
SYMB_5	4.633	1.508	-.416	-.142	.233	4.291
SYMB_6	4.807	1.491	-.487	-.139	.195	5.130
SAC_1	2.700	1.508	.763	-.054	.423	2.366
SAC_3	2.710	1.649	.705	-.532	.424	2.359
SAC_4	2.152	1.562	1.379	.983	.461	2.169
SAC_5	1.840	1.347	1.872	3.030	.277	3.610
SAC_6	1.773	1.294	1.967	3.425	.230	4.353
SAC_7	1.827	1.283	1.845	3.070	.288	3.469
SAC_8	1.687	1.236	2.167	4.364	.234	4.266
VALUER_1	4.867	1.347	-.441	.204	.303	3.296
VALUER_2	5.052	1.422	-.617	.262	.444	2.252
VALUER_3	5.232	1.428	-.760	.269	.234	4.269
VALUER_4	5.160	1.324	-.576	.190	.268	3.731
VALUER_5	5.023	1.401	-.610	.289	.283	3.537

Table 2: CFA item descriptives with normality tests and collinearity diagnostics for COPA

Items	μ	σ	SI	KI	Tolerance	VIF
COPA_1	4.656	1.736	-0.513	-0.471	0.653	1.531
COPA_2	5.219	1.254	-0.692	0.667	0.648	1.544
COPA_3	5.404	1.401	-0.919	0.745	0.527	1.897

Note: μ – item mean; σ – item standard deviation; SI – skewness index, KI – kurtosis index, VIF – variance inflation factors

Appendix 7: Study 4c sample profile

UK (n=449)	Valid %	Frequency
Gender		
Male	50.1%	225
Female	49.9%	224
Employment status		
Employed	53.0%	238
Self-employed	10.5%	47
Unemployed	4.7%	21
Student	8.7%	39
Retired	13.4%	60
Other	9.8%	44
Education		
GCSE/O'Level	23.9%	107
A Level	28.3%	127
Bachelor's Degree	27.9%	125
Master's Degree	13.2%	59
PhD	2.0%	9
Other	4.7%	21
Income (GBP)		
0-10,000	16.5%	74
10,001-20,000	24.3%	109
20,001-30,000	20.1%	90
30,001-40,000	9.4%	42
40,001-50,000	7.6%	34
50,001-60,000	3.1%	14
60,001-70,000	1.6%	7
70,001-80,000	.7%	3
80,001+	2.5%	11
Prefer not to say	13.0%	64

UK (n=449)	Valid %	Frequency
Place of photography in life of a camera user		
Occasionally capturing photographs	36.7%	165
Regularly capturing photographs	35.9%	161
Hobby/keen amateur photographers	22.0%	99
Something between a hobby and a profession	3.8%	17
A profession/professional photographers	.4%	2
Something else	1.1%	5
Camera type		
Smartphone/Mobile phone camera	20.8%	92
Compact/Point and shoot camera	34.3%	152
Compact zoom/Bridge camera	16.0%	71
Compact system/Mirrorless camera	2.9%	13
DSLR camera	25.5%	113
Other type of camera	.5%	2
Camera brand		
Apple	5.6%	24
Canon	23.6%	101
FujiFilm	10.5%	45
Kodak	2.3%	10
Nikon	15.2%	65
Nokia	2.1%	9
Panasonic	9.3%	40
Pentax	1.4%	6
Olypmus	6.3%	27
Samsung	9.3%	40
Sony	7.5%	32
Do not know	.7%	3
Other	6.4%	26

Appendix 8: Study 4d sample profile

UK (n=151)	Valid %	Frequency
Gender		
Male	46.4%	70
Female	53.6%	81
Employment status		
Employed	49.0%	74
Self-employed	6.6%	10
Unemployed	4.0%	6
Student	11.3%	17
Retired	15.2%	23
Other	13.9%	21
Education		
GCSE/O'Level	24.0%	36
A Level	26.7%	40
Bachelor's Degree	26.0%	39
Master's Degree	12.0%	18
PhD	1.3%	2
Other	10.0%	15
Income (GBP)		
0-10,000	22.7%	34
10,001-20,000	28.0%	42
20,001-30,000	18.7%	28
30,001-40,000	10.7%	16
40,001-50,000	4.7%	7
50,001-60,000	4.7%	7
60,001-70,000	1.3%	2
70,001-80,000	0%	0
80,001+	0%	0
Prefer not to say	9.3%	14

UK (n=151)	Valid %	Frequency
Place of photography in life of a camera user		
Occasionally capturing photographs	39.1%	59
Regularly capturing photographs	40.4%	61
Hobby/keen amateur photographers	16.6%	25
Something between a hobby and a profession	4.0%	6
A profession/professional photographers	0%	0
Something else	0%	0
Camera type		
Smartphone/Mobile phone camera	17.9%	26
Compact/Point and shoot camera	49.0%	71
Compact zoom/Bridge camera	6.2%	9
Compact system/Mirrorless camera	5.5%	8
DSLR camera	20.0%	29
Other type of camera	1.4%	2
Camera brand		
Apple	4.1%	6
Canon	19.2%	28
FujiFilm	10.3%	15
Kodak	1.4%	2
Nikon	18.5%	27
Nokia	2.1%	3
Panasonic	6.2%	9
Pentax	2.7%	4
Olypmus	4.8%	7
Samsung	12.3%	18
Sony	10.3%	15
Do not know	.7%	1
Other	7.5%	11

Appendix 9: Cross-loadings for the reflective indicators in the customer's value creation model

Table 1: Cross-loadings for the first-step customer's value creation model

Item/Scale	COR	EQPRF	EXB	IB	RESINT	SAC	SAT	SKEQ	SKILLS	SYMB	UCESK
COR_1	**.818**	.357	.333	.465	.374	-.122	.418	.385	.246	.367	.415
COR_2	**.891**	.383	.464	.542	.401	-.062	.476	.440	.261	.444	.435
COR_3	**.919**	.374	.401	.524	.368	-.002	.483	.386	.277	.449	.421
COR_4	**.886**	.406	.413	.517	.375	-.031	.441	.412	.314	.449	.464
COR_5	**.898**	.404	.391	.551	.362	-.015	.513	.411	.316	.453	.450
EQPRF_1	.365	**.759**	.157	.335	.292	-.035	.262	.421	.305	.179	.441
EQPRF_2	.321	**.881**	.244	.297	.312	.124	.237	.418	.418	.295	.447
EQPRF_3	.360	**.907**	.254	.323	.365	.081	.258	.461	.416	.289	.479
EQPRF_4	.448	**.890**	.231	.428	.403	.055	.326	.525	.451	.324	.555
EXB_2	.428	.239	**.880**	.571	.378	-.183	.476	.352	.295	.439	.339
EXB_3	.373	.215	**.880**	.509	.341	-.132	.469	.292	.265	.443	.274
EXB_4	.389	.170	**.839**	.432	.301	.101	.404	.275	.278	.559	.220
EXB_5	.355	.212	**.851**	.478	.290	.086	.460	.255	.243	.579	.208
EXB_6	.441	.287	**.918**	.577	.362	.041	.534	.347	.321	.604	.329
IB_2	.552	.374	.537	**.895**	.475	-.027	.664	.463	.398	.483	.472
IB_3	.506	.336	.582	**.852**	.328	.044	.635	.400	.369	.506	.379
IB_4	.462	.341	.489	**.874**	.385	-.079	.582	.426	.375	.447	.427
IB_5	.548	.370	.474	**.897**	.378	-.044	.722	.442	.383	.482	.439
RESINT_1	.385	.361	.259	.355	**.838**	.013	.249	.315	.272	.320	.385
RESINT_2	.324	.336	.431	.393	**.822**	-.067	.256	.340	.266	.319	.360
RESINT_3	.383	.333	.286	.391	**.898**	-.064	.249	.312	.229	.314	.345
SAC_1	.023	.082	.103	.067	.002	**.766**	.040	.048	.131	.241	.131
SAC_3	-.050	.106	.033	-.041	.062	**.763**	-.074	.009	.146	.159	.093
SAC_4	.007	.112	.063	.082	-.009	**.771**	-.008	.070	.113	.181	.072
SAC_5	-.095	.022	-.131	-.106	-.100	**.844**	-.093	-.057	.014	.108	-.030
SAC_6	-.055	.043	-.069	-.048	-.054	**.878**	-.066	-.048	-.005	.191	-.009
SAC_7	-.077	-.008	-.079	-.098	-.107	**.835**	-.096	-.033	-.004	.126	-.014
SAC_8	-.033	.008	-.072	-.038	-.115	**.850**	-.039	-.021	.034	.154	.008
SAT_1	.529	.316	.539	.742	.295	-.062	**1.000**	.403	.360	.515	.411
SKEQ_1	.437	.491	.278	.450	.355	-.038	.372	**.912**	.556	.281	.643
SKEQ_2	.336	.368	.246	.391	.304	-.055	.322	**.888**	.437	.203	.516
SKEQ_3	.365	.513	.349	.359	.294	.172	.284	**.761**	.559	.399	.554
SKEQ_4	.436	.446	.323	.486	.344	-.099	.399	**.876**	.510	.250	.558
SKILLS_1	.288	.451	.264	.414	.280	.046	.336	.536	**.906**	.312	.538
SKILLS_2	.320	.461	.214	.363	.260	.040	.261	.568	**.843**	.241	.562
SKILLS_3	.268	.313	.303	.298	.254	.101	.246	.465	**.813**	.327	.445
SKILLS_4	.288	.419	.326	.428	.285	.039	.378	.546	**.912**	.331	.552
SKILLS_5	.247	.402	.298	.387	.235	.131	.339	.531	**.902**	.358	.530
SYMB_1	.443	.315	.635	.555	.369	.137	.450	.362	.372	**.803**	.325
SYMB_2	.404	.270	.533	.531	.279	.207	.448	.315	.346	**.828**	.331
SYMB_3	.431	.280	.475	.468	.304	.195	.422	.250	.320	**.883**	.323
SYMB_4	.346	.235	.354	.379	.278	.113	.365	.185	.195	**.782**	.262
SYMB_5	.402	.252	.454	.456	.309	.166	.444	.240	.252	**.868**	.270
SYMB_6	.442	.264	.536	.501	.336	.197	.460	.301	.308	**.893**	.306
UCESK_1	.446	.486	.302	.416	.380	.055	.359	.578	.535	.343	**.907**
UCESK_2	.444	.527	.245	.422	.370	.035	.352	.617	.529	.294	**.927**
UCESK_3	.481	.542	.327	.511	.426	.040	.424	.643	.594	.360	**.940**

Table 2: Cross-loadings for the second-step customer's value creation model

Item/Scale	RESINT	SAT
RESINT_1	**.837**	.249
RESINT_2	**.823**	.256
RESINT_3	**.898**	.249
SAT_1	.295	**1.000**

Appendix 10: Convergent validity test for the formative constructs in the customer's value creation model

Convergent validity test – the first step customer's value creation model

The two indexes present in the first-step customer's value creation path model (RESADJ, SERV) were examined for convergent validity. The 1-item reflective RESADJ-redundant construct named RESADJR was formed using the RESADJR_1 item (Q52 in Appendix 16). The 1-item reflective SERV-redundant construct, named SERVR, was formed using the SERVR_1 item (Q63 in Appendix 16). The results in both cases were satisfactory given that the path coefficients between formative and redundant reflective measures were above .70 (see Figure 1 and Figure 2). Given the results both sets of formative indicators (for RESADJ and SERV) demonstrated convergent validity in the first-step customer's value creation path model.

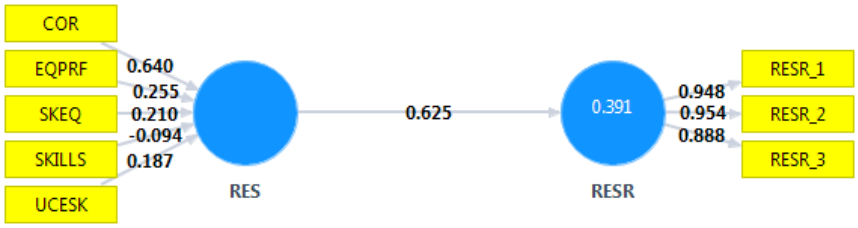
Figure 1: Redundancy analysis for RESADJ in the first-step customer's value creation model

Figure 2: Redundancy analysis for SERV in the first-step customer's value creation model

Convergent validity test – the second step customer's value creation model

The four indexes (RES, VALUE, RESADJ and SERV) were examined for convergent validity. The RES (as a former HOC) obtained five indicators from the first-step model estimation. The 3-item reflective RES-redundant construct named RESR was used for the test. The result of the redundancy analysis was below the required threshold of .70 (.625). However, given the highly heterogeneous nature of the construct a slightly lower convergent validity was expected (see Figure 3). Furthermore, initial 1st order multi-item latent constructs have lost certain degree of their variance when converted to the RES items. This can also explain why the path value for the redundancy analysis was below .70.

Figure 3: Redundancy analysis for RES in the second-step customer's value creation model

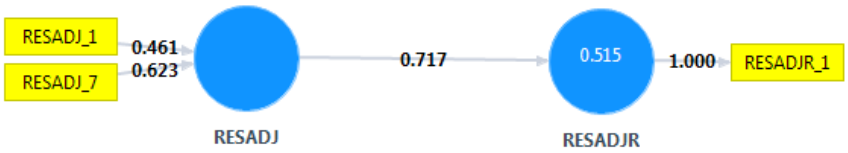


VALUE (as a HOC) obtained its indicators from the first-step model estimation. For the purpose of redundancy analysis a multi-item scale named VALUER was used. The result of the redundancy analysis was above the required threshold of .70, thus confirming the expected convergent validity of VALUE (see Figure 4).

Figure 4: Redundancy analysis for VALUE in the second-step customer's value creation model

For the RESADJ same procedure from the first-step model was repeated. The result was satisfactory given that the formative and reflective measures for resource adjustment strongly correlated and the path coefficient was above .70 (see Figure 5).

Figure 5: Redundancy analysis for RESADJ in the second-step customer's value creation model



In the case of the formative construct SERV, the result was identical to the result in the first step model assessment.

Appendix 11: Latent scores for the customer's value creation model

Table 1: Latent scores for the first-step value creation model

Latent	μ	σ	CV
COR	5.305	1.053	.198
EQPRF	4.781	1.238	.259
EXB	5.617	1.073	.191
IB	5.460	1.154	.211
RESADJ	3.009	1.624	.540
RESINT	5.601	0.958	.171
SAC	1.998	1.123	.562
SAT	5.503	1.192	.217
SERVICE	5.484	1.044	.190
SKEQ	5.009	1.136	.227
SKILLS	4.334	1.130	.261
SYMB	4.730	1.279	.270
UCESK	4.857	1.208	.249

Table 2: Latent scores for the second-step value creation model

Latent	μ	σ	CV
RES	5.002	0.875	.175
RESADJ	3.048	1.656	.543
RESINT	5.601	0.958	.171
SAT	5.503	1.192	.217
SERVICE	5.491	1.038	.189
VALUE	5.645	1.113	.197

Appendix 12: Cross-loadings for the reflective indicators in the value co-creation model

Table 1: Cross-loadings for the first-step value co-creation model

Item/Scale	COPA	COR	EQPRF	EXB	IB	RESINT	SAC	SAT	SKEQ	SKILLS	SYMB	UCESK
COPA_1	**.637**	-.135	-.028	.176	-.003	.133	-.014	-.025	-.036	.078	.034	-.036
COPA_2	**.897**	.251	.222	.376	.402	.254	.013	.345	.194	.284	.333	.168
COPA_3	**.874**	.180	.199	.312	.256	.310	.017	.198	.062	.184	.261	.175
COR_1	.135	**.795**	.372	.333	.518	.428	-.186	.380	.278	.275	.292	.232
COR_2	.174	**.845**	.286	.426	.485	.330	-.235	.375	.266	.246	.400	.264
COR_3	.184	**.874**	.447	.301	.421	.322	-.052	.402	.338	.286	.347	.291
COR_4	.213	**.898**	.399	.392	.510	.490	-.142	.408	.255	.273	.488	.309
COR_5	.200	**.897**	.461	.351	.491	.373	.015	.471	.373	.292	.414	.351
EQPRF_1	.160	.250	**.803**	.068	.250	.251	-.095	.297	.306	.209	.005	.306
EQPRF_2	.190	.370	**.913**	.242	.352	.346	.056	.440	.380	.310	.259	.376
EQPRF_3	.213	.431	**.912**	.213	.333	.343	-.057	.367	.484	.394	.187	.399
EQPRF_4	.192	.494	**.868**	.158	.303	.355	-.116	.383	.353	.243	.194	.392
EXB_2	.243	.371	.115	**.829**	.429	.419	-.322	.300	.103	.213	.274	.207
EXB_3	.297	.351	.168	**.879**	.404	.421	-.264	.316	.087	.161	.292	.170
EXB_4	.360	.297	.204	**.825**	.462	.320	.001	.411	.142	.194	.565	.168
EXB_5	.359	.325	.197	**.829**	.456	.410	-.119	.411	.099	.194	.505	.237
EXB_6	.356	.451	.177	**.905**	.487	.420	-.114	.399	.137	.190	.524	.186
IB_2	.305	.460	.348	.426	**.755**	.428	-.172	.558	.264	.370	.454	.346
IB_3	.263	.472	.309	.470	**.875**	.289	.036	.681	.199	.322	.597	.303
IB_4	.305	.437	.240	.477	**.827**	.433	-.177	.555	.263	.332	.376	.365
IB_5	.306	.526	.305	.409	**.899**	.380	-.037	.733	.317	.325	.503	.395
RESINT_1	.213	.295	.343	.195	.268	**.755**	-.031	.275	.248	.376	.290	.207
RESINT_2	.308	.433	.289	.520	.438	**.838**	-.226	.296	.211	.339	.412	.372
RESINT_3	.244	.408	.329	.410	.409	**.924**	-.104	.285	.262	.359	.355	.302
SAC_1	.097	-.065	-.087	-.082	.004	-.063	**.700**	-.034	.051	.108	.136	-.001
SAC_3	.155	-.009	-.042	-.054	.051	.076	**.780**	.006	.129	.226	.189	.042
SAC_4	.072	-.091	-.033	-.101	-.079	-.168	**.751**	-.095	.079	.055	.034	-.063
SAC_5	-.118	-.229	-.109	-.228	-.116	-.187	**.839**	-.098	-.032	-.011	.001	-.089
SAC_6	-.053	-.153	-.016	-.208	-.143	-.149	**.871**	-.106	.010	.006	.053	-.060
SAC_7	-.017	-.117	.007	-.154	-.101	-.162	**.850**	-.008	.076	.040	.086	.003
SAC_8	-.041	-.138	-.058	-.194	-.142	-.177	**.852**	-.062	.018	-.029	.083	-.040
SAT	.287	.471	.430	.435	.757	.339	-.073	**1.000**	.350	.290	.479	.397
SKEQ_1	.099	.296	.322	.055	.236	.237	.016	.288	**.883**	.523	.194	.503
SKEQ_2	.083	.279	.267	.111	.260	.202	.023	.268	**.873**	.479	.143	.468
SKEQ_3	.179	.327	.445	.207	.265	.229	.131	.316	**.765**	.482	.194	.442
SKEQ_4	.089	.267	.430	.072	.288	.282	.023	.307	**.873**	.509	.095	.498
SKILLS_1	.221	.306	.223	.181	.410	.361	.117	.289	.559	**.919**	.311	.537
SKILLS_2	.162	.223	.296	.170	.275	.351	.067	.204	.609	**.859**	.206	.553
SKILLS_3	.139	.341	.328	.263	.349	.397	-.043	.214	.390	**.803**	.339	.494
SKILLS_4	.301	.234	.303	.210	.331	.408	.072	.272	.505	**.878**	.236	.513
SKILLS_5	.305	.267	.319	.138	.367	.313	.084	.283	.539	**.917**	.285	.533
SYMB_1	.257	.359	.163	.475	.488	.320	-.058	.445	.201	.285	**.794**	.243
SYMB_2	.303	.399	.242	.549	.559	.379	.058	.513	.134	.247	**.846**	.222
SYMB_3	.242	.384	.132	.350	.482	.343	.096	.356	.177	.297	**.886**	.222
SYMB_4	.184	.365	.092	.296	.391	.352	.073	.315	.083	.262	**.791**	.178
SYMB_5	.321	.362	.156	.451	.467	.382	.132	.357	.144	.249	**.863**	.227
SYMB_6	.282	.432	.199	.460	.508	.367	.191	.410	.185	.278	**.874**	.264
UCESK_1	.174	.313	.352	.175	.362	.315	-.061	.330	.515	.581	.237	**.927**
UCESK_2	.153	.279	.420	.201	.380	.296	-.005	.389	.568	.517	.263	**.938**
UCESK_3	.161	.344	.418	.255	.429	.385	-.044	.391	.506	.581	.256	**.941**

Table 2: Cross-loadings for the second-step value co-creation model

Item/Scale	RESINT	SATISF
RESINT_1	**.751**	.275
RESINT_2	**.841**	.296
RESINT_3	**.923**	.285
SAT_1	.339	**1.000**

Appendix 13: Convergent validity test for the formative constructs in the value co-creation model

Convergent validity test – the first step value co-creation model

In the case of RESADJ, the result was satisfactory given that its formative and reflective measures strongly correlated and the path coefficient was above .70 (see Figure 1). In the case of formative construct SERV the results were also excellent given that its formative and reflective measures strongly correlated and the path coefficient was above preferred value of .80 (see Figure 2). Therefore, given the results it can be concluded that both sets of formative indicators demonstrated convergent validity.

Figure 1: Redundancy analysis for RESADJ in the first-step value co-creation model

Figure 2: Redundancy analysis for SERV in the first-step value co-creation model

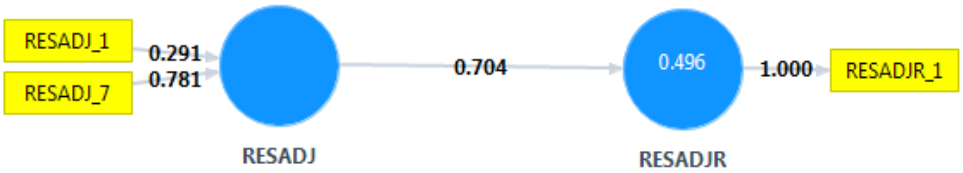
Convergent validity test – the second step value co-creation model

The four indexes (RES, VALUE, RESADJ and SERV) were examined for convergent validity. The results of the redundancy analysis for the four indexes were above the required threshold of .70, thus confirming convergent validity (see Figures 3, 4 and 5). For the redundancy analysis for SERV see Figure 2.

Figure 3: Redundancy analysis for RES in the second-step value co-creation model

Figure 4: Redundancy analysis for VALUE in the second-step value co-creation model

Figure 5: Redundancy analysis for RESADJ in the second-step value co-creation model



In the case of the formative construct SERV, the result was identical to the result in the first step model assessment.

Appendix 14: Latent scores for the value co-creation model

Table 1: Latent scores for the first-step value co-creation model

Latent	μ	σ	CV
COPA	5.165	1.175	.227
COR	5.343	1.094	.205
EQPRF	4.758	1.260	.265
EXB	5.912	1.036	.175
IB	5.525	1.043	.189
RESADJ	3.067	1.670	.545
RESINT	5.690	0.857	.151
SAC	2.166	1.163	.537
SAT	5.722	1.126	.197
SERVICE	5.595	0.947	.169
SKEQ	4.984	1.150	.231
SKILLS	4.131	1.099	.266
SYMB	5.024	1.162	.231
UCESK	4.839	1.203	.249

Table 2: Latent scores for the second-step value co-creation model

Latent	μ	σ	CV
RES	5.000	0.802	.160
RESADJ	2.917	1.615	.554
RESINT	5.691	0.857	.151
SAT	5.722	1.126	.197
SERVICE	5.590	0.951	.170
VALUE	5.696	1.028	.180

Appendix 15: Value of RESADJ latent construct across different adjustment modes – ANOVA test

Study 4c: RESADJ scores in customer's independent value creation across different adjustment modes

Descriptives

RESADJ

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Auto-settings	235	2.38	1.486	.097	2.19	2.57	1	7
Semi-auto settings	140	3.88	1.446	.122	3.63	4.12	1	7
Manual settings	68	3.68	1.633	.198	3.29	4.08	1	7
Total	443	3.05	1.658	.079	2.90	3.21	1	7

Test of Homogeneity of Variances

RESADJ

Levene Statistic	df1	df2	Sig.
.806	2	440	.447

ANOVA

RESADJ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	228.578	2	114.289	51.004	.000
Within Groups	985.940	440	2.241		
Total	1214.518	442			

Multiple Comparisons

Dependent Variable: RESADJ

Scheffe

(I) ADJUSTMENT	(J) ADJUSTMENT	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Auto-settings	Semi-auto settings	-1.497*	.160	.000	-1.89	-1.10
	Manual settings	-1.304*	.206	.000	-1.81	-.80
Semi-auto settings	Auto-settings	1.497*	.160	.000	1.10	1.89
	Manual settings	.194	.221	.682	-.35	.74
Manual settings	Auto-settings	1.304*	.206	.000	.80	1.81
	Semi-auto settings	-.194	.221	.682	-.74	.35

*. The mean difference is significant at the 0.05 level.

RESADJ

Scheffe[a,b]

ADJUSTMENT	N	Subset for alpha = 0.05	
		1	2
Auto-settings	235	2.38	
Manual settings	68		3.68
Semi-auto settings	140		3.88
Sig.		1.000	.618

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 114.925.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Study 4d: RESADJ scores in value co-creation across different adjustment modes

Descriptives

RESADJ

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Auto-settings	73	2.2700	1.48449	.17375	1.9236	2.6164	1.00	7.00
Semi-auto settings	50	3.7047	1.48639	.21021	3.2823	4.1272	1.00	7.00
Manual settings	22	3.4025	1.56099	.33280	2.7104	4.0946	1.00	6.73
Total	145	2.9366	1.63472	.13576	2.6682	3.2049	1.00	7.00

Test of Homogeneity of Variances

RESADJ

Levene Statistic	df1	df2	Sig.
.360	2	142	.698

ANOVA

RESADJ

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	66.715	2	33.357	14.891	.000
Within Groups	318.097	142	2.240		
Total	384.812	144			

Multiple Comparisons

Dependent Variable: RESADJ

Scheffe

(I) ADJUSTMENT	(J) ADJUSTMENT	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Auto-settings	Semi-auto settings	-1.43474*	.27475	.000	-2.1144	-.7551
	Manual settings	-1.13250*	.36402	.009	-2.0330	-.2320
Semi-auto settings	Auto-settings	1.43474*	.27475	.000	.7551	2.1144
	Manual settings	.30224	.38292	.733	-.6450	1.2495
Manual settings	Auto-settings	1.13250*	.36402	.009	.2320	2.0330
	Semi-auto settings	-.30224	.38292	.733	-1.2495	.6450

*. The mean difference is significant at the 0.05 level.

RESADJ

Scheffe[a,b]

ADJUSTMENT	N	Subset for alpha = 0.05	
		1	2
Auto-settings	73	2.2700	
Manual settings	22		3.4025
Semi-auto settings	50		3.7047
Sig.		1.000	.680

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 37.901.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Appendix 16: Questionnaire

WELCOME SCREEN

Dear participant,

Welcome and thank you for agreeing to participate in this survey, which is part of my doctoral research. The aim of the survey is to get insight into how people use cameras and other photographic equipment including for example lenses, tripods, flashes, light meters etc. This excludes any activities that are related to using photo-editing software. If you have recently taken photographs (excluding quick snapshots) and own a camera of some description, you are eligible to take part. Your data will remain completely confidential. The survey takes approximately 15 minutes. The findings will only be used for academic research purposes – my doctoral thesis and journal papers. The research is fully funded by Nottingham University Business School.

Kind regards,

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SCREENING QUESTIONS 1

1. Do you have a camera of some description? ☐ Yes ☐ No (*screen out*)

2. Have you recently taken photographs (excluding quick snapshots) that you can recall details (i.e. the equipment used, the settings and adjustments you applied, the way the photographs turned out)?

   ☐ Yes ☐ No (*screen out*)

SCREENING QUESTIONS 2

3. How old are you? _____

4. Gender: ☐ Male ☐ Female

5. What employment status describes you best at the moment?

   ☐ Employed
   ☐ Self-employed
   ☐ Unemployed
   ☐ Student
   ☐ Retired
   ☐ Other. Please specify:_____

YOU AND PHOTOGRAPHY

6. Please select one option that describes you the best.

   In my life photography is:

   ☐ Something I do occasionally to capture photographs
   ☐ Something I do regularly to capture photographs
   ☐ A hobby – I am a keen amateur photographer
   ☐ Something between a hobby and a profession
   ☐ A profession – I am a professional photographer
   ☐ Something else. Please specify: _____

7. As a photographer, you consider yourself to be:	a beginner	1	2	3	4	5	6	7	highly proficient

WHAT MAKES PHOTOGRAPHS TURN OUT WELL OR BADLY

8. The way my photographs turn out is mostly down to:
   ☐ me
   ☐ the equipment I use
   ☐ both me and the equipment I use

YOUR SKILLS IN TAKING PHOTOGRAPHS

In terms of **taking photographs**, please evaluate yourself

9. I consider myself to be	not at all talented	1	2	3	4	5	6	7	very talented
10. I consider myself to be	not at all experienced	1	2	3	4	5	6	7	very experienced
11. I consider myself to be	not at all creative	1	2	3	4	5	6	7	very creative
12. I consider myself to be	very poor at photography	1	2	3	4	5	6	7	very good at photography
13. Overall, I consider myself to be	not at all skilful	1	2	3	4	5	6	7	extremely skilful

YOUR MOST RECENT CAMERA USE (EPISODIC QUESTIONS)

EQUIPMENT MOST RECENTLY USED

Think about camera you used for capturing the most recent photograph(s).

14. Select the type of camera you used to capture these most recent photograph(s).

- ☐ Smartphone/Mobile phone camera
- ☐ Compact/Point and shoot camera
- ☐ Compact zoom/Bridge camera
- ☐ Compact system/Mirrorless camera
- ☐ DSLR camera
- ☐ Not sure about camera type
- ☐ Other type of camera.

15. What brand was the camera you used?

- ☐ Apple
- ☐ Canon
- ☐ FujiFilm
- ☐ Kodak
- ☐ Nikon
- ☐ Nokia
- ☐ Panasonic
- ☐ Pentax
- ☐ Olympus
- ☐ Samsung
- ☐ Sony
- ☐ Do not know
- ☐ Other

16. The camera I used for capturing the most recent photograph(s) was:

- ☐ the camera I had from before
- ☐ the camera I had just purchased/got
- ☐ borrowed items
- ☐ rented/leased items

Please try to recall the most recent situation where you were consciously taking a photograph, not just taking a quick snap shot.

17. Please select one situation (or photography type) that best describes the main focus of your most recent photographs.

- ☐ Portrait
- ☐ Selfie
- ☐ Landscape
- ☐ Sport/Action
- ☐ Night
- ☐ Macro
- ☐ Street
- ☐ Human form
- ☐ Architecture/Interior
- ☐ Plants/Animals
- ☐ Astrophotography/Star trail
- ☐ Product/Commercial
- ☐ Light graffiti
- ☐ Fine art
- ☐ Event
- ☐ Studio
- ☐ Underwater
- ☐ Something else. Please specify:_____

USAGE CONTEXT SPECIFIC KNOWLEDGE

The last photographic situation you were in (*piping the situation from Q17*) may have required particular equipment, settings, vantage points and set ups in order for you to create a good photograph(s). Thinking of when you took your most recent photograph(s), please evaluate the following statements about your knowledge with regards to this most recent usage context.

18. I already had excellent knowledge about what this situation would require in order to take a good photograph	strongly disagree	1	2	3	4	5	6	7	strongly agree
19. I already had excellent knowledge about how to set everything up in order to produce a good photograph in this situation	strongly disagree	1	2	3	4	5	6	7	strongly agree
20. I already had excellent knowledge about how to capture a good photograph in this type of situation	strongly disagree	1	2	3	4	5	6	7	strongly agree

EQUIPMENT PERFORMANCE

Thinking about **all the equipment items you used to take the most recent photograph(s)**, please evaluate the following statements.

21.	The equipment could do all the things I wanted it to do	strongly disagree	1	2	3	4	5	6	7	strongly agree
22.	The equipment I used is known for its high performance	strongly disagree	1	2	3	4	5	6	7	strongly agree
23.	The equipment I used is known for taking excellent photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree
24.	Overall, for this situation my photographic kit was excellent	strongly disagree	1	2	3	4	5	6	7	strongly agree

KNOWLEDGE ABOUT THE EQUIPMENT USED

Thinking now about how knowledgeable and skilled you were when you were taking these most recent photographs, please evaluate the following statements.

Given the situation:

25.	I had a very good level of knowledge about the equipment I used	strongly disagree	1	2	3	4	5	6	7	strongly agree
26.	I had a lot of experience with the equipment I used	strongly disagree	1	2	3	4	5	6	7	strongly agree
27.	I had previously gathered a lot of information about the equipment I used	strongly disagree	1	2	3	4	5	6	7	strongly agree
28.	I was very confident using this equipment	strongly disagree	1	2	3	4	5	6	7	strongly agree

PHOTOGRAPHIC CONTEXT

Think of all the aspects of context (time for taking the photographs, vantage points, natural light, background scenery and focal subjects) of your most recent camera, please evaluate the following statements:

29.	The context for taking photographs was just as I wanted	strongly disagree	1	2	3	4	5	6	7	strongly agree
30.	The situation was excellent for taking photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree
31.	Everything that made up context (light, vantage points, subjects/objects, background) was excellent	strongly disagree	1	2	3	4	5	6	7	strongly agree
32.	The context lent itself perfectly to the shoot.	strongly disagree	1	2	3	4	5	6	7	strongly agree
33.	Overall, the shooting conditions were excellent	strongly disagree	1	2	3	4	5	6	7	strongly agree

PEOPLE PRESENT DURING YOUR CAMERA USAGE

34.	Were there any other people assisting you in any way or acting as the subjects in the most recent photographs you took?	☐Yes	☐No*(skip Q35-Q38)*

35. Did participants actively helped on the process of taking photographs?

☐Yes
☐No

Thinking of the people-participants who were in your photographs, shared the activity of taking the photographs or assisted you in any way, please evaluate following statements:

36.	Without these particular participants the photo wouldn't be as good	strongly disagree	1	2	3	4	5	6	7	N/A	strongly agree
37.	The contribution of the participants was excellent	strongly disagree	1	2	3	4	5	6	7	N/A	strongly agree
38.	Overall, the participant(s) was/were very important for the way the photographs turned out	strongly disagree	1	2	3	4	5	6	7	N/A	strongly agree

ASSESSMENT OF RESOURCES

Thinking of whether everything was in place for you to take a good photographs (your equipment, knowledge and skills, focal objects/subjects, context etc.) please evaluate the following statements.

39.	I had everything I needed to take the photograph successfully	strongly disagree	1	2	3	4	5	6	7	strongly agree
40.	I had everything I needed to capture a good photograph	strongly disagree	1	2	3	4	5	6	7	strongly agree
41.	All the resources I had at my disposal were excellent for capturing the photograph I wanted	strongly disagree	1	2	3	4	5	6	7	strongly agree

FOLLOWING PRICES (*CATCH TRIAL QUESTION*)

We know that you have to read a lot in this survey. We want to make sure that you carefully read these instructions. In order to make sure you are doing so please do not answer the following question, rather skip to the next page.

42. I regularly check the prices of camera equipment. ☐True (*screen out*) ☐False (*screen out*)

TAKING THE MOST RECENT PHOTOGRAPHS – ADJUSTMENTS

When taking photographs lots of different adjustments can be made in order to get desired photograph(s). These adjustments can include configuring camera and additional equipment, taking position of adequate vantage point, composing photographs, and all other creative and technical tasks to "set up" the stage for taking the desired photographs.

Having this in mind, please answer the following questions.

43. My equipment was on:

☐Auto-settings
☐Semi-auto settings (i.e. aperture priority, shutter priority etc.)
☐Manual mode
☐Do not remember

44. Was there enough time for you to do all the adjustments you wanted to do? ☐Yes ☐No

Please assess how many of the listed adjustments have you performed (due to different reasons) just prior to or during taking your most recent photograph(s):

45.	Adjustments on equipment settings	none	1	2	3	4	5	6	7	many
46.	Adjustments to compensate for equipment that I did not have at the time	none	1	2	3	4	5	6	7	many
47.	Adjustments to compensate for features that the equipment did not have	none	1	2	3	4	5	6	7	many
48.	Adjustments to address the conditions of the context/situation	none	1	2	3	4	5	6	7	many
49.	Adjustments to get the photographs from the right angle (including your own position)	none	1	2	3	4	5	6	7	many
50.	Adjustments to set objects/subjects just as I wanted	none	1	2	3	4	5	6	7	many
51.	Adjustments in order to set up everything right	none	1	2	3	4	5	6	7	many
52.	Overall, a lot of adjustments had to be made for me to capture the desired photograph(s)	strongly disagree	1	2	3	4	5	6	7	strongly agree

CAPTURING THE PHOTOGRAPHS

Thinking of the most recent photograph(s) you took, please evaluate the following statements:

53.	I shot the photograph(s) when I thought everything was well set up	strongly disagree	1	2	3	4	5	6	7	strongly agree
54.	I shot the photograph(s) when I thought it was the right moment	strongly disagree	1	2	3	4	5	6	7	strongly agree
55.	I shot the photograph(s) when I thought everything was ready	strongly disagree	1	2	3	4	5	6	7	strongly agree
56.	I shot the photograph in such a way to produce a synergistic effect from all the resources I had available (equipment, skills, context, and participants).	strongly disagree	1	2	3	4	5	6	7	strongly agree
57.	The photograph(s) was/were the best I could achieve with the equipment I had	strongly disagree	1	2	3	4	5	6	7	strongly agree
58.	The photograph(s) was/were the best I could achieve with the knowledge I had	strongly disagree	1	2	3	4	5	6	7	strongly agree
59.	The photograph(s) was/were the best I could achieve with the skills I had	strongly disagree	1	2	3	4	5	6	7	strongly agree
60.	The photograph(s)was/were the best I could achieve given the focal objects/subjects	strongly disagree	1	2	3	4	5	6	7	strongly agree
61.	The photograph(s) was/were the best I could achieve given the context	strongly disagree	1	2	3	4	5	6	7	strongly agree
62.	The photograph(s) was/were the best I could achieve given the time I had for shooting	strongly disagree	1	2	3	4	5	6	7	strongly agree
63.	Given everything, the photograph(s) was/were the best that I could achieve	strongly disagree	1	2	3	4	5	6	7	strongly agree

THE MOST RECENT PHOTOGRAPHS

Thinking of the most recent photographs you took, please evaluate the following statements.

INSTRUMENTAL BENEFITS										
64.	In a technical sense, the photographs turned out very well	strongly disagree	1	2	3	4	5	6	7	strongly agree
65.	In an aesthetic sense, the photographs turned out very well	strongly disagree	1	2	3	4	5	6	7	strongly agree
66.	The photographs were good enough to be framed	strongly disagree	1	2	3	4	5	6	7	strongly agree
67.	The photographs were good enough to be shown to others	strongly disagree	1	2	3	4	5	6	7	strongly agree
68.	Looking at the photographs, I really achieved what I wanted	strongly disagree	1	2	3	4	5	6	7	strongly agree
EXPERIENTIAL BENEFITS										
69.	Taking these photographs helped me record important memories/moments	strongly disagree	1	2	3	4	5	6	7	strongly agree
70.	I enjoyed taking these photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree
71.	Taking these photographs was fun	strongly disagree	1	2	3	4	5	6	7	strongly agree
72.	Taking these photographs was exciting	strongly disagree	1	2	3	4	5	6	7	strongly agree
73.	Taking these photographs meant a lot to me	strongly disagree	1	2	3	4	5	6	7	strongly agree
74.	Overall, taking these photographs was a great experience.	strongly disagree	1	2	3	4	5	6	7	strongly agree
SYMBOLIC BENEFITS										
75.	The photographs I captured speak for me	strongly disagree	1	2	3	4	5	6	7	strongly agree
76.	The photographs produced a strong reaction from others	strongly disagree	1	2	3	4	5	6	7	strongly agree
77.	The photographs helped me make a statement	strongly disagree	1	2	3	4	5	6	7	strongly agree
78.	The photographs really helped me to communicate with others	strongly disagree	1	2	3	4	5	6	7	strongly agree
79.	The photographs I took helped me present myself the way I wanted	strongly disagree	1	2	3	4	5	6	7	strongly agree
80.	Overall, the photographs I captured really helped me to express myself	strongly disagree	1	2	3	4	5	6	7	strongly agree

SACRIFICES										
81.	Shooting these photographs took a lot of my energy	strongly disagree	1	2	3	4	5	6	7	strongly agree
82.	I wish I had done something else instead of taking these photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree
83.	Taking these photographs was mentally challenging	strongly disagree	1	2	3	4	5	6	7	strongly agree
84.	I had to spend a lot of money to be able to take these photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree
85.	Taking these photographs was extremely stressful	strongly disagree	1	2	3	4	5	6	7	strongly agree
86.	I feel I paid a high price to take this photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree
87.	I feel I put too much effort into taking these photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree
88.	Overall, taking the photographs required a big sacrifice	strongly disagree	1	2	3	4	5	6	7	strongly agree
OVERALL VALUE										
89.	I gained a lot from these photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree
90.	The benefits I gained from these photographs significantly outweigh the sacrifices/efforts I made to capture them	strongly disagree	1	2	3	4	5	6	7	strongly agree
91.	Overall, the most recent photographs I took are very valuable to me	strongly disagree	1	2	3	4	5	6	7	strongly agree
92.	Using all the resources (my knowledge, equipment, context, actors) helped me create a photograph of value to me	strongly disagree	1	2	3	4	5	6	7	strongly agree
93.	The process of taking this photograph was very valuable to me	strongly disagree	1	2	3	4	5	6	7	strongly agree

SATISFACTION WITH THE MOST RECENT PHOTOGRAPHS

94.	I am extremely satisfied with my most recent photographs	strongly disagree	1	2	3	4	5	6	7	strongly agree

THE FOLLOWING QUESTIONS ARE ABOUT YOU

95. Please select the highest level (or the equivalent) qualification(s) you have completed.

- ☐ GCSE/ O'Level
- ☐ A Level
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ PhD
- ☐ Other. Please specify:_____

96. What is your annual income in GBP?

- ☐ 0-10,000
- ☐ 10,001-20,000
- ☐ 20,001-30,000
- ☐ 30,001-40,000
- ☐ 40,001-50,000
- ☐ 50,001-60,000
- ☐ 60,001-70,000
- ☐ 70,001-80,000
- ☐ 80,001+
- ☐ prefer not to say

97.	I am a	thinker	1	2	3	4	5	6	7	doer
98.	I adopt new technologies	very late	1	2	3	4	5	6	7	very early

THANK YOU SCREEN

Thank you very much for your time and valuable inputs!

If you would like to participate in the prize draws please leave your e-mail address in the box below. Your e-mail address will **only** be used for the purpose of this prize draw.

If you have any questions, please do not hesitate to contact us.

Kind regards,

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